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Railway Traingram Service

TRAINGRAM SERVICE, in general, does not seem to have proved as successful as some of its advocates would like it to be, nor has it been sufficiently reliable, efficient or safe to cause the average railway officer to feel that communications which require expeditious handling should be transmitted in that manner. The question is not as to whether there is a need for such service, for it is quite generally conceded that the demand exists for an efficient and safe scheme of transmission which will be less expensive than the telegraph.

Some roads have used the traingram for at least a small part of their business for many years. Various schemes have been tried to expedite such message traffic, but the results have been far from satisfactory. However, there are two general schemes of handling traingrams in use today which seem to have possibilities that are worth developing. Briefly, one scheme provides that each department of a railroad shall traingram its own messages, whereby the communications are handled as train mail; while the other concentrates the traingram service under the control of the telegraph department with special messenger service. The advocates of the first plan claim that its success depends upon proper supervision. The advocates of the second scheme can hardly claim less, because the control of the service is placed in the hands of a particular department. If proper supervision is the desirable feature in the first scheme, the question resolves itself into that of centralizing the supervision, otherwise there will be no supervision; so that ultimately both schemes are essentially the same, except that in the second plan the supervision has already been centralized in a single department, with the mail and baggage departments co-operating. At the recent meeting of the Telegraph and Telephone Division of the American Railroad Association a committee on message traffic presented a report on traingram service which advocated the centralization of control of such service in the telegraph department.

The volume of railroad business which can be handled economically by traingram service depends to some extent upon local conditions on each individual road, including the locations of the various large offices and the intermediate train service. It is quite generally true that the bulk of the railroad business handled by message traffic reaches the telegraph department in large offices late in the afternoon; consequently, at least a portion of it cannot be transmitted to the receiving offices along the road before their closing times. It is practical, therefore, to convert some of the messages into traingrams, which are sealed under a special cover provided for the purpose and properly addressed; then despatched by messenger to the proper train, and delivered to the train baggageman, who in turn exercises special care in handling and delivering them to employees of the telegraph department at the designated stations, who make the final distribution in the same manner as telegrams. If, under the traingram system messages were despatched as promptly as they could be to the trains and delivered as promptly as telegrams are after reaching their destinations, and if mailgrams were confined to that part of railway business which might otherwise be considered as requiring telegraph service, it is quite likely that railway officers would appreciate the importance of traingram service and feel safe in permitting a relatively large portion of their business to be handled by that system at a large saving in cost of transmission.

A Personnel Department for the Railways

ODIUS CONTRASTS between the efficiency of railway organizations and those of large industrial plants, to the disadvantage of the former, are usually made without any thought as to the obstacles imposed on the roads in the administration of their widely scattered forces. To be truly comparable, the industry set up as a standard for comparison should have its manufacturing functions scattered in small units over a wide territory and under the direction of sub-foremen who see their superiors but once or twice daily on a passing train or during a weekly or fortnightly visit. In other words, the conditions with which the railroads are confronted in an endeavor to perfect a thoroughly efficient organization are far more severe than those imposed on most other lines of endeavor conducted for profit.

But to point out the difficulties of the problem is not to solve it, and this question is now one of utmost importance on the eve of the return of the railroads to private management. For some time employment on railroads has been considered entirely in terms of the prerogatives and rights of groups or common masses, but fortunately there are those who still insist that some consideration should be given to the individual who shows superior initiative, industry and reliability, and in the last analysis the success of any undertaking involving the employment of men in large numbers is largely dependent on the proper selection of the natural leaders. After two years of concerted effort to magnify the importance of the group, is it not time to give more recognition to the individual?

This problem has two phases, namely, the selection of the workmen best suited for a given class of employment and the discovery of likely material for the development of officers. The one is about as important as the other, and neither has received the recognition it deserves. The first is left largely in the hands of subalterns of each department; the other falls upon the higher officer to be disposed of as his individual ideas may dictate. This course has a certain amount of justification from the fact that leadership is founded primarily on an ability to know men, and that therefore great leaders are adept in selecting men to serve their lieutenants.

On the other hand, advanced thought in industrial management points to the shortcomings of this system. It fails to develop the latent possibilities of those men who, under this hit-or-miss plan, lack opportunity to assert themselves and, becoming discouraged, seek other forms of employment which seem to offer more opportunities for recognition. This system tends also to engender a one-sided organization. We find some roads on which nearly all executive officers are graduate train despatchers, others where they are for the most part engineers, etc. Like begets like. Most executives are inclined to the opinion that his own particular line of training was best suited to develop the most efficient and the broadest general manager. The effect of this is that one department looms much larger in the eyes of the management than any other and produces a poorly balanced property.

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The cure for this condition implies both scientific selection and broad training, so as to insure not only a supply of good material, but also a graduated, diversified training that will develop the qualities of leadership, afford broader expe-

rience and serve to weed out the defectives. The first of these requirements, selection, has received insufficient attention from the railroads. The second, training, has been accorded more consideration, as, for instance, through special apprenticeship systems and plans for rotation of officers. It is also commonly practiced individually by many a railway executive who, having hit upon some promising yardmaster or chief clerk, pushes him around from one job to another, so that the protege is given opportunities for broadening his experience, while his sponsor is also afforded an opportunity to determine his real worth.

The opportunity for improvement does not imply the use of new methods, but the doing through a preconceived, thoroughly organized system for the entire scope of employment, what is now being done through unorganized individual efforts. Presumably this should be carried on by an employment service or personnel department. Marked advancements have been made along this line by the industries, but owing to the peculiar conditions surrounding all classes of railway employment, with the possible exception of the shop crafts, the exact nature of such an organization for the railroads can only be determined after very careful study and experimentation.

To obtain real results from such an undertaking implies no little sacrifice. Non-revenue-producing bureaus entail considerable expense, while the benefits derived are not readily identified on the ledger. Courses of training involving the shifting of individuals from one department to another will result in considerable seeming waste, since training in one department does not necessarily fit one for effective output in another. The man's time is occupied partly in learning and partly in producing. This raises the question as to some pecuniary sacrifice on the part of the individual beneficiary of such a system. These are only a few of the problems to be considered in establishing a personnel department, but, after all, if it has been found profitable and necessary to maintain separate branches of the railway organization for the purchase and care of inanimate materials, why should it not be equally necessary to provide a separate department for the procurement and selection of the human material?

The Influence of Variations in Traffic on Maintenance Expenditures

THE EXTENT to which maintenance of way expenditures should vary with fluctuations in traffic is assuming new importance at the present time. It is evident that an increase in the tonnage passing over a given track will result in accelerated deterioration of that track, which must be made good by more maintenance work. It is likewise recognized that an increase in traffic does not necessarily give rise to an equivalent expenditure for upkeep. The problem is to determine the relation between traffic and the wear and tear on the property. Its solution is of special importance at the present time because of the radical readjustment of traffic which has resulted from its wholesale diversion from one line to another during the two years of federal control and the obligation of the government to return the roads to their owners in as good condition as when turned over. Since it is generally conceded that three has been a certain deficit in the maintenance of the properties as a whole, the problem is to fix this amount.

Certain expenditures for maintenance of way are independent of traffic. Typical of these are the repair of fences and highway crossings, the mowing of the right-of-way, the clearing of snow from the switches and station platforms, etc. Other expenses, such as the renewal of ties, are influenced to a limited degree by variations in traffic, while still others, such as the renewal of rails, are affected directly.

This is not a new prbolem. It has been discussed for years. It has been considered by committees of the American Railway Engineering Association from time to time without tangible results. More recently a special committee has been working on it with officers of the maintenance of way section of the Division of Operation of the Railroad Administration. While this committee has not reached any definite decision, it is to be hoped that its work will be prosecuted to a point where some basis of comparison may be arrived at.

So many elements which are more or less intangible in character enter into the maintenance of tracks that it is exceedingly difficult if not impossible to determine whether a particular line has been maintained to a given standard during the period of federal control. The indefinite nature of such units of measurements as are now available will lead to much difficulty and possible controversy in arriving at an ultimate settlement. However, the value of a comparative unit such as this is not limited to the present, for the same question confronts the officer in charge of the maintenance of a considerable mileage of line in distributing his appropriations over various divisions with different traffic densities.

Railroads Are Still Incurring a Deficit

STATEMENTS BEING ISSUED by the Railroad Administration are adapted to give the impression that before the coal strike came the railways had ceased to incur a deficit. It has been indicated in these statements that in the months of July, August, September and October the traffic of the railways had approached normal; that during these months they more than earned the government guarantees to them; and that the very large deficit incurred in the earlier part of the year was due to the comparatively small amount of traffic during that part of the year.

These statements of the Railroad Administration, while doubtless not intended to be misleading, are adapted to give the public a false impression regarding the existing railroad situation. The way in which the Railroad Administration arrives at its conclusion that the railways have ceased to incur a deficit is very simple. The government guarantees amount to an *average* of about $75,000,000 a month. Therefore, when the railroads earn more than this amount of net operating income in a month the Railroad Administration announces that they have earned a surplus. But the railroads always have earned more net operating income in the last six months than in the first six months of each year. The government guarantees are based on the average amount earned under private operation during the three years ended on June 30, 1917; and if we are to know how well the railways are really doing under government operation we must compare their actual results month by month under govern-

	Average net operating income in test period			Net operating income earned Nov. 1918 to Oct. 1919, inclusive	Loss or gain
November ..	$83,536,000	November ...	1918	$57,123,000	—$26,413,000
December ..	73,282,000	December ...	1918	28,237,000	—45,045,000
January	56,613 000	January	1919	18,784,000	—37.829,000
February ...	47,934,000	February	1919	10,106,000	—37,828,000
March	68,251,000	March	1919	10.843,000	—57,408,000
April	67,289,000	April	1919	26,115,000	—41,174,000
May	77,385,000	May	1919	39,462,000	—37,923,000
June	82,550,000	June	1919	52.271,000	—30,279,000
July	75.341,000	July	1919	77,177,000	+ 1,836,000
August	86,860,000	August	1919	92,397,000	+ 5,537,000
September ..	91,273 000	September ..	1919	77,763.000	—13.510,000
October	94,333,000	October	1919	76,397,000	—17,936,000
	$904,657,000			$566,675,000	—$337,972,000

ment operation with the actual results obtained by them in the *same months* of the test period.

The foregoing table gives the average net operating income earned month by month by the Class I railways in the test period, the average net operating income actually earned by them in the 12 months November, 1918, to October, 1919, inclusive, and the increase or decrease in net operating income during the year ended October 31 as compared with the test period.

This table shows that the only two months of the entire 12 in which the net operating income earned was as great as the average amount earned in the corresponding months of the test period were July and August, 1919. The net loss for the entire 12 months as compared with the test period was $337,972,000. The most interesting and important figures in the table are those for the months July to October, 1919, inclusive. These are the months during which it has been stated that railway traffic had become about as large as it was in 1918 and that a surplus was earned instead of a deficit being incurred. The traffic handled in these four months actually was about as large as in the same four months of 1918, which is practically the same as saying that it was almost equal to the largest traffic ever handled. The total earnings also were about the same as in the corresponding months of 1918, being $1,955,613,000 in these four months of 1918 and $1,935,572,000 in 1919. The table shows, however, that in spite of the fact that the traffic and total earnings in these four months of 1919 were almost the largest in history, the railways made a gain of only $7,373,000 in net operating income in the months of July and August and made a loss of $31,446,000 in September and October as compared with the test period, making a net loss for these four months of $24,073,000.

The facts regarding the deficit being incurred are even worse than the statistics given in our table indicate. The government is not only guaranteeing to the railways the average net operating income earned in the three years ended June 30, 1917, but, in addition, interest must be paid on the new investment which has been made in the railroads under government control, which now amounts to approximately $850,000,000. The interest on this additional investment, which must be paid by the government directly or indirectly although its amount cannot be accurately stated, must now be running at the rate of about $42,500,000 a year, or about $3,500,000 a month. The total deficit, including this interest, incurred in the year ending with October was close to $375,000,000, and the deficit for the four months ending with October, including this interest, must have been about $38,000,000. The deficit in October itself, in which it has been stated a surplus was earned, must have been, including this additional interest, about $22,000,000; and the ratio of operating expenses to total earnings was 80 per cent.

It is necessary to emphasize the fact that the government when the coal strike came, although it was handling almost all the business the railroads could move, was still incurring a large deficit because otherwise the shippers and the public may get the idea that the railways can be safely returned to private operation without an advance in rates. The facts show that the railroads under the most favorable conditions have been unable to earn the guarantees under government operation, and undoubtedly the coal strike will have an effect upon both earnings and expenses which will largely increase the deficit. The October, 1919, figures afford us as good a test as we have had of the financial results that the railroads can produce with existing prices, wages and rates, and they show that to continue the existing rates, if government operation were continued, would be to go on incurring a big deficit, while to continue them after the railways were returned to private operation would be to throw a large part of the railways into bankruptcy.

Letters to the Editor

Hand-Motion Signals in South Africa and United States.

HARTFORD, Conn.

TO THE EDITOR:

Your discussion of fundamental principles of train operation in a recent issue awakens interest in a good many questions which might be profitably considered from that standpoint, rather than in our usual superficial way. For example, look at the circumstances of the collision of passenger trains at McGriff, Ga., reported that same issue (November 28, page 1072), where an engineman, presumably of long experience, moved forward, on a dark night, on a hand signal which he was not sure was intended for his train.

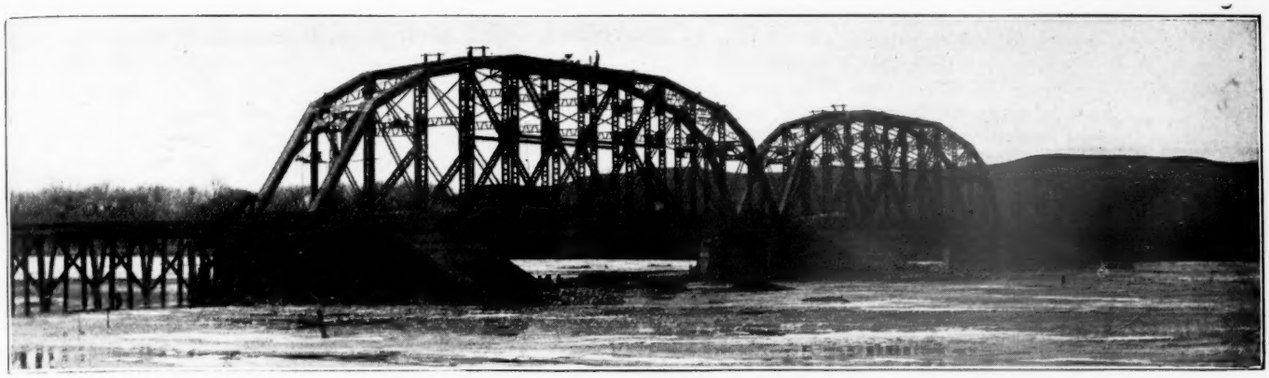
One of the fundamental principles of giving hand signals is, or should be, to give them where they cannot be seen by any engineman except the one for whom they are intended. It would appear in this case that the brakeman, being in front of the northbound train to which he was motioning, might just as well have stood in such a position that his body would have hidden his lantern from the southbound engineman, who made the mistake. Why do we not conform our every-day practice to this simple fundamental principle?

This point is particularly important where a hand signal is given by a man who is in front of the engine which is to be moved on the signal. In making a rule that the same motion shall always mean "move forward" we have deprived ourselves of the important principle that the natural way to give a hand signal to another person is to tell him to move either *toward* you or *from* you. That principle applied in the old days; but we have grown to be so scientific nowadays that we cannot endure anything so simple. I remember reading some years ago in the rules of the railroads of South Africa—or perhaps it was Australia—that what we call the go-ahead signal was there defined to mean "move from the person giving the signal," and the signal which we use to move backward meant "move toward the person giving the signal."

Sometimes it is necessary to go to the other side of the globe to learn very simple things which we ought to learn at home.

E. S. A.

Scenes on the Government's Alaska Railroad. Grading at Mile 208



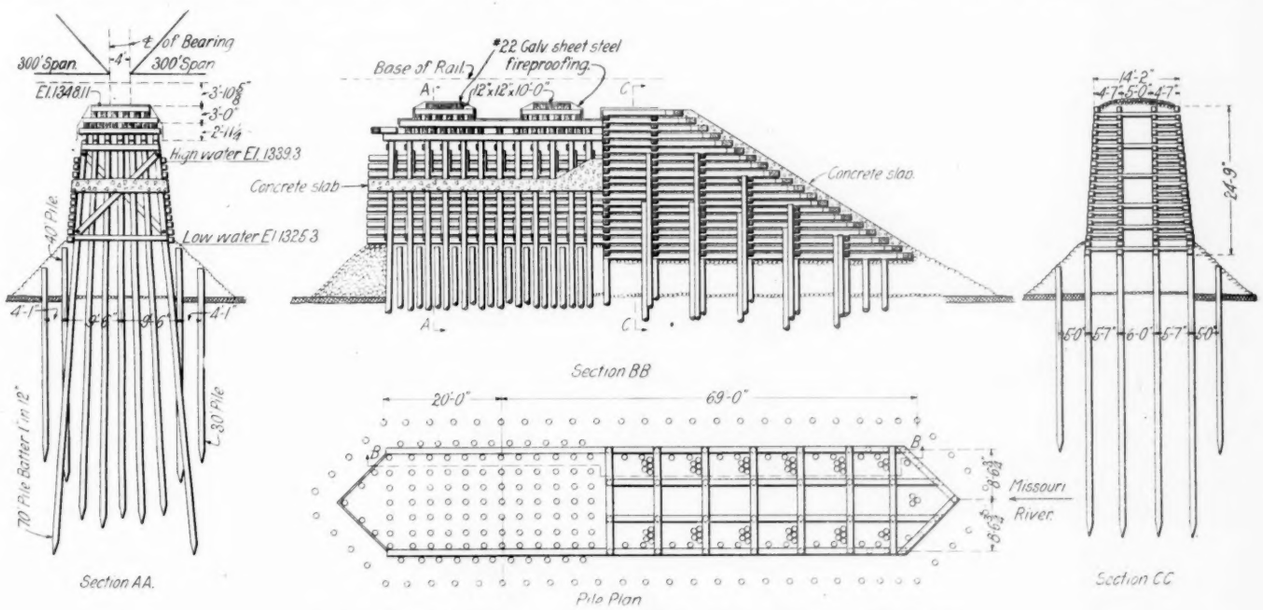
Two 300-ft. Spans on Pile Piers

An Unusual Design for a Missouri River Bridge

Wartime Conditions Enforce Use of Unique Piers Under Heavy Trusses of C. M. & St. P. Structure

ONE OF THE BEST illustrations of engineering practices under war-time conditions is to be found in the recently completed bridge of the Chicago, Milwaukee & St. Paul over the Missouri river at Chamberlain, S. D. Not only does this embody the extraordinary use of pile piers as supports for 300-ft. steel truss spans, but it also involves an interesting combination of reinforced concrete and timber construction as the most effective solution of a difficult engineering problem.

This crossing of the Missouri river serves the Black Hill's division of the St. Paul, a light traffic line extending 219 miles west to Rapid City, S. D. Built in 1905 and 1906 through an undeveloped territory, the line did not have promise of sufficient traffic to warrant the outlay necessary for a permanent bridge at the start. The original structure consisted of 1,770 ft. of pile trestle, with a pontoon barge 366 ft. long to meet government requirements for a draw opening for the river traffic. In the years subsequent to the completion of this bridge studies were made from time to time for a suitable permanent structure for this crossing. These considerations were responsible for the purchase, in 1917 from the Kansas City Terminal, of two 300-ft. single-track, through truss spans released from a bridge over the Kaw river, but plans for a new structure were brought to a head suddenly in the spring of 1918 when the pontoon, which had seen 13 years of severe service, developed leaks which caused it to be withdrawn from service. Traffic was restored in a short time by the use of some second-hand girders to form a temporary swing span, which afforded a 50-ft. channel opening, while the remaining draw opening was closed by a pile trestle.



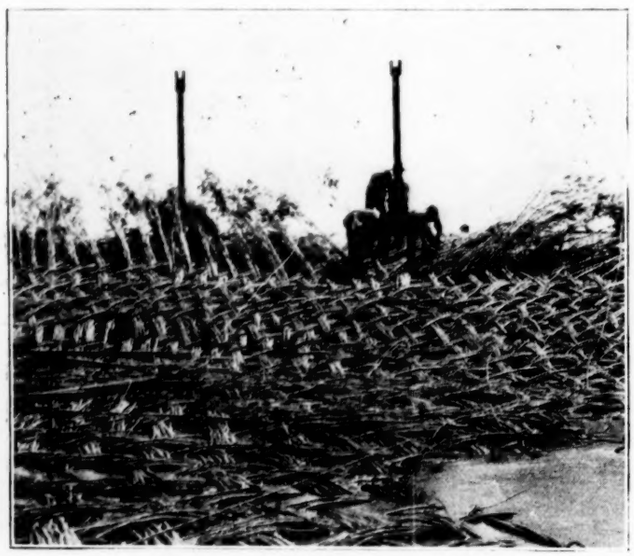
Plan and Sections of One of the Pile Piers and Its Ice Breaker

While the maintenance of a temporary structure had been the source of no little trouble to the railroad because of periodic floods of protracted duration, the construction of a permanent bridge was open to serious objection, not only because of the established war policy of the government—and particularly the Railroad Administration—to discourage any undertaking that would interfere with the directing of

all national energies to the winning of the war, but also because the bridge site is in many ways unfavorable to permanent construction. Foundation conditions are such as to require a very expensive substructure, entailing large expenditures both in money and in labor and a long construction period. The location of the crossing is also subject to objections. Certain characteristics of the river upstream from the bridge indicated the desirability of a better location for a permanent structure, and the change of line which this would involve was out of the question under war conditions. As a consequence, it was highly desirable to avoid the use of masonry piers if a substitute construction could be designed that would meet the requirements imposed by the unfavorable characteristics of the Missouri river.

The bottom of the river is a deep bed of alluvial silt over sand and gravel. This material is so light that the increase in the velocity of the current during flood periods results in a marked lowering of the river bottom, so that the increased volume of water is accommodated by the enlargement of the channel thus obtained as well as by the raising of the flood level. This condition, of course, introduced no little conjecture as to the security of any substructure not founded on bed rock. Another serious matter is the prevalence of ice floes during the spring breakup, which are capable of exerting enormous pressures against any structure interposed in the river channel. The problem then was to develop pile piers that could be made safe against scouring and capable of resisting the ice pressures.

The manner of accomplishing this may be learned from a study of the detailed drawing of one of the piers as built. The construction consists essentially of a combination of a pile pier supporting the superstructure with a rock-filled ice breaker of timber cribbing protected against scour by

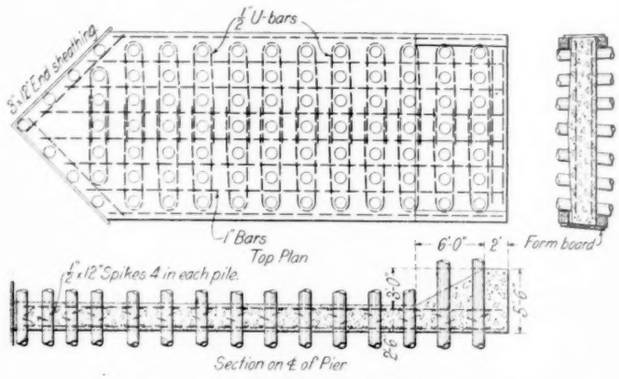


Weaving the Willow Mattress

willow mattresses and rip-rap. The vertical load imposed on the pier is carried by 70-ft. piles, capped by a grillage of crossed timbers. It was the intention to provide a bridge seat in the form of a concrete slab 3 ft. thick, but this was abandoned in favor of a top grillage of 3 tiers of 12-in. by 12-in. timbers because of lack of sufficient time to place the concrete in position for the steel work before the spring breakup.

Each side of the pile pier is protected by 12-in. by 12-in. timbers bolted to the outside piles, with 3-in. open joints between. These ties are long enough to extend upstream and form the outer walls of the ice breaker, the sides of which extend 49 ft. 6 in. beyond the upstream end of the pier. The ice breaker also has two interior longitudinal walls as well as cross walls spaced 8 ft. center to center. The upstream end is pointed and slopes back at an angle of 30 deg. with the horizontal. The crib was erected on piles driven at the intersections of the longitudinal and cross walls, while other piles driven in groups of five next to the cross walls serve as a measure of resistance against the ice thrust.

The application of concrete to this construction serves primarily to increase its effectiveness in resisting the ice floes. The most natural development was the provision for



Details of Reinforcing Slab for the Pier

a concrete armor over the nose of the crib. This has a minimum thickness of 1 ft. and is reinforced by 1-in. bars placed longitudinally at 1-ft. centers and transversely (horizontally) at 2-ft. intervals in elevation. The edge of the nose is protected by a relayer rail adequately anchored into the concrete. This construction forms a strong, smooth surface to lift and break the ice as it is carried against the pier by the current of the river.

The other concrete feature, while not of as obvious utility, is equally important. This is a horizontal diaphragm or slab of concrete 2 ft. 6 in. thick, covering the entire area of the pier and surrounding the pier piles at a level slightly below high water. The slab increases in thickness at its upstream end so as to present a face 5 ft. 6 in. high against the upstream end of the crib. Thus the slab is designed to receive the thrust of the ice pressure and transmit it uniformly to all the piles in the pier. This slab is supported against sliding down the piles by four ½-in. by 12-in spikes driven part way into each pile, so that the exposed portions were in the concrete when the slab was cast. Both upper and lower faces of the slab were reinforced with 1-in. bars.

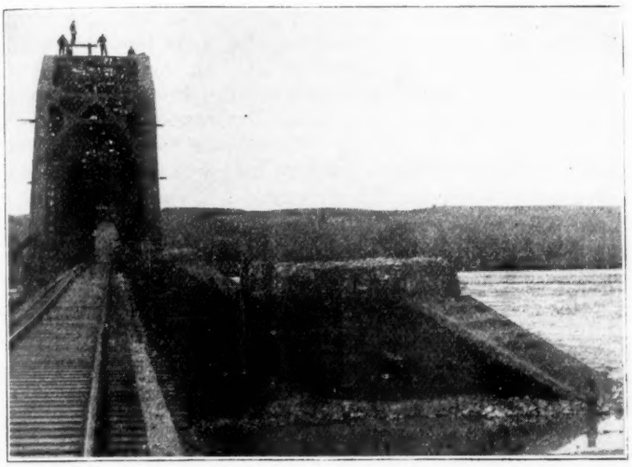
Rip-rap was placed in the crib to fill it to the top, while in the pier the space around the piles was filled with rock to the low water level. As the walls of the pier and crib have their bottoms at about the low water level, or slightly below, the rock spreads out below this level on a natural slope all around the structure. Additional piles driven outside of the pier and ice breaker tend to stabilize the rock slopes thus formed.

To protect the piers against scour the plan called for willow mattresses 150 ft. by 220 ft. in area surrounding each pier and built according to standard methods of mattress construction and sunk by weighting with rock.

Construction

As the project involved the use of a large number of piles, the pile driving was a major feature of the construction work. The work was started in July, 1918. All piles coming underneath the existing pile trestle were driven by track drivers, one fitted with a No. 1 Union Iron Works steam

hammer and the other with a 4,000-lb. drop hammer. All other piles required were driven by a steam hammer mounted on a 40-ft. by 60-ft. power barge that had been used to operate the old pontoon bridge. A water jet was used with each pile. The power boat was also fitted up to supply the water for jetting. A 7-in. by 12-in. by 7-in. steam pump with a 6-in. discharge was installed for this purpose, using 1¼-in. pipes as nozzles for the jets. The driving downstream from the existing structure was handled readily by controlling the position of the scow with lines from the bridge, but upstream from the bridge the position of the



End View of the Bridge Showing One of the Ice Breakers With Its Concrete Covered Nose

boat had to be maintained by means of an anchor placed in the river about 500 ft. upstream. A 3,000-lb. drop hammer was first employed for this purpose, but it was not heavy enough, and it was reinforced with a concrete block weighing about 4,000 lb.

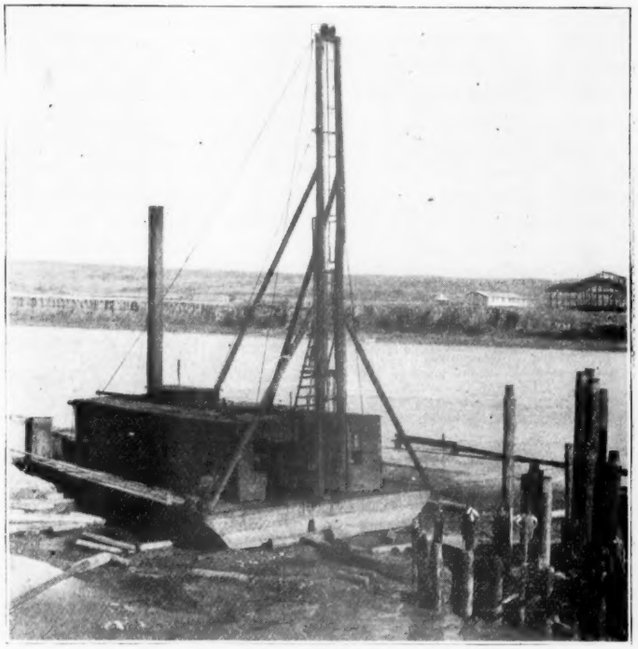
Further difficulty was encountered when it came to driving the piles for the north end of the west pier, where a sand bar had formed at a level of 5 ft. above that of the water in the river. To get the scow up to the pier a portion of this sand bar was removed by sand pumps set up on the scow. While the barge was being advanced into the sand bar in this manner, a dike was thrown up behind it, so that when the pumping was finished the scow was entirely surrounded by the sand bar. This protected it from the current of the river, and was also of advantage when it came to placing the lower sheathing for the pier, since it was possible to pump out the water within the bar and place the sheathing with the top 2 ft. below the prevailing stage of water in the river. The piles in the piers were 60 to 75 ft. long and were driven to refusal, some of them reaching bed rock, while others stopped in gravel and boulders after penetrating 30 to 40 ft. of sand and gravel.

The design for the new structure included a 262-ft. pontoon to replace the original one. The construction of this pontoon formed an important part of the work. This entailed a large amount of heavy woodwork, which was facilitated by the use of power equipment. Much of the framing was done on a band saw, all holes were bored by air tools and bolts were driven with pneumatic hammers. Another feature of the work in which power equipment proved a great labor saver was in the construction of the three longitudinal bulkheads, consisting of 8-in. by 16-in. timbers laid flat and separated ¾ in. by the use of Howe truss packing washers 6 in. in diameter, with rims 3 in. thick. These washers were counter-sunk into the timber, and as there were over 2,000 of them a large amount of special recessing was required. As no tool could be found on the market to cut these recesses a local machinist finally made one from design prepared in the field office which was operated by a Little Giant reversible drill. This was found to work very satisfactorily.

All sheathing was beveled for caulking, and each spike through the bottom and side sheathing was wrapped with oakum before driving. The bottom and sides were caulked with one thread of cotton and two of oakum. The first three threads were hawsed up before the last two threads were driven. The last two threads were placed and caulking strips were extended to cover the seams. The deck of the pontoon was caulked with one thread of cotton and two of oakum and the seams then filled with pitch, 10 per cent of tallow being added to make it more pliable.

Work on the pontoon was started on December 5, 1918, and the pontoon was ready for launching on March 1, 1919, although this did not take place until April 7 on account of low water.

This work was done under the general direction of C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul. The design was under the immediate supervision of H. C. Lotholz, engineer of design, while the construction was under the direction of A. Daniels, district engineer, with the aid of W. E. Duckett, assistant engineer.



Type of Barge Driver Used for All Piles That Could Not Be Driven from the Trestle

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PRECEPT AND PRACTICE.—When I started my railroad career I studied the Book of Rules just enough to let me slide by in the examination. My next move was to find out what I didn't have to do. I got more information from the fellows regarding what I didn't have to do than I did on the book of rules. Well, it wasn't very long until I told the yardmaster that I didn't have to do something and he moved those below me one notch higher on the seniority list. I didn't approve of this. I was discharged. I was away for more than a year and I had plenty of time to think the matter over. The more I thought about it the more I agreed with the yardmaster and I have thanked him since for teaching me this lesson. He gave me enough rope and I hung myself. Each time you study the schedule study the Book of Rules and before long you will know them both.—*Duit Wright.*

National Park Travel in 1919

SOME INTERESTING FIGURES showing the amount of travel to the national parks during 1919 are contained in the annual report of the Secretary of the Interior, from which the following extracts have been taken:

The tremendous popularity of our national parks was fully attested by the unprecedently large number of visitors during the 1919 season, which closed about the middle of September. Freed from the restrictions against war-time travel, which had been a war necessity, the appeal of the great natural attractions of the parks was irresistible and the response spontaneous. The national parks became the cynosure of the eyes of a war-weary and hard-worked people, bent on taking a holiday where they could derive the greatest benefits. There the refreshing atmosphere of the great out of doors, the soothing diversion of the natural scenery, and the specific qualities of the fresh air brought mental and physical relief to hundreds of thousands. When one considers that travel to our national parks and monuments exceeded 810,000 visitors—over 755,000 to the parks and over 55,000 to the monuments—it is evident that the recreative value of the parks is a tremendous factor in the health, wealth, and contentment of the nation.

The following tables will give an itemized review of the travel:

VISITORS TO THE NATIONAL PARKS IN 1919

Hot Springs	[1]160,490
Yellowstone	62,261
Sequoia	30,443
Yosemite	58,564
General Grant	21,574
Mount Rainier	55,232
Crater Lake	16,645
Wind Cave	26,312
Platt	[1]25,000
Sullys Hill	4,026
Mesa Verde	2,287
Glacier	18,956
Rocky Mountain	169,492
Lassen Volcanic	[1]2,500
Hawaii	[2]
Mount McKinley	[2]
Grand Canyon	37,745
Lafayette	[1]64,000
Total	755,527

[1]Estimated. [2]No Record.

VISITORS TO SOME OF THE NATIONAL MONUMENTS IN 1919[1]

Capulin Mountain (New Mexico)	[2]1,500
Casa Grande (Arizona)	3,795
Colorado (Colorado)	[2]3,000
Muir Woods (California)	[2]43,200
Petrified Forest (Arizona)	[2]3,000
Zion (Utah)	1,814
Total	55,309

[1]No records for other 17 national monuments. [2]Estimated.

An analysis of these figures shows that the travel in 1919 was 67 per cent over that of 1918 and 54 per cent more than that of the previous high-water mark in park travel of 1917. An astounding increase occurred also in motor travel to the national parks. The increase of the number of cars, 95,140 in 1919 over that of 55,296 in the record year 1917, is 72 per cent. While no accurate general record is kept in all the parks of the number tourists entering in motor cars, in Yellowstone it is found that they average about four to the car, as will be seen from the following tables for the past three years:

Year	Number of private cars	Number of tourists
1917	5,703	21,268
1918	4,734	17,317
1919	10,773	40,986

With this average in mind it is estimated that about 400,000 visitors entered the parks and monuments by motor. The travelers came from every state in the Union and from foreign countries, and the motorists from every corner of the country and from Canada and Mexico. Some of the motorists visited all of the national parks of the continental west and others toured from two to five. More than half carried their own supplies and camp equipment, and they enjoyed the playgrounds in their own way.

In these large travel figures the influence of the activities of the United States Railroad Administration is also reflected. During the war travel was discouraged. Soon after the cessation of hostilities, however, the administration changed to a stand just the opposite to the former policy, and by judicious advertising and educating of those of its employees who come in direct contact with the tourists, stimulated the patronage of the winter resorts in the South and West to unusually gratifying proportions. Later, through its passenger traffic committee, it directed its efforts toward the summer resorts of the country with special emphasis on the national parks. The promotion of park travel, of course, fell naturally to the western committee of the railroads and to the Bureau of Service, National Parks and Monuments, with headquarters at Chicago. This latter bureau was well organized and prepared to perform its functions without delays when the restrictions were raised. By attractively designed and well-written national park booklets they presented a feature of their campaign that offered at once the most important inducement to travel in the parks that has appeared since the publication of the National Parks Portfolio some three years ago. The very satisfying result achieved by this bureau testifies to its great importance and the extreme desirability of its surviving as one of the institutions of the Railroad Administration whenever the railroads are turned over to private operation.

At this writing restrictions against overseas travel have also been removed. The competition of Europe for tourist travel will begin with renewed activity. We have in this country scenery that is the peer and in most instances the superior of that found abroad, but the value of tourist travel as an industry has hardly been recognized in this country. Various industries of the United States are protected as a matter of course, but what protection will the great resorts of this country have from the greatest campaign for tourist travel in the foreign lands that will ever have been waged? As a nation we have failed to grasp the significance and value of the tourist industry. Every dollar of revenue received from it stays here. Before the war Americans spent in England alone about $200,000,000 a year, and in France and Switzerland $400,000,000. We should develop this industry, as other countries are doing, into one of our biggest economic assets.

To properly develop this the establishment of a touring agency is a present national necessity. It is vitally important to the nation, and, as there is no other agency of the government that is so interested or so closely in touch with the traveling public as the National Park Service, the agency should be established there. Such an activity could co-operate closely with the resorts of the United States, the railroads, automobile associations, highway associations, mountaineering clubs,, etc. Promotive literature bearing the stamp of approval of the department and of the National Park Service would most effectively stimulate and maintain travel in the United States because its data would not be selfish or exaggerated and would have the confidence of everybody using it.

SPAIN HAS TOO MUCH COAL.—Spain, in common with most European countries, has a coal problem, but its situation is diametrically opposite to that of its neighbors; that is, it has a supply greater than the demand. Piled up at the heads and in the coal ports of Asturias lies a stock estimated at from 750,000 to 1,000,000 metric tons (metric ton equals 2,204.6 pounds), and the problem of the moment is how to dispose of this surplus.—*N. Y. Tribune.*

Railroad Legislation as Developed up to Date*

Neither the Esch Bill Nor the Cummins Provides a Means for the Restoration of Railroad Credit

By R. S. Lovett
Chairman, Union Pacific System.

IT SEEMS USEFUL to take stock at this time of the progress made by the present Congress during its first session toward the enactment of legislation necessary to meet the railroad emergency. The controlling necessity for additional railroad legislation is to re-establish railroad credit, which failed even before the war under the system of regulation in force, and to save from bankruptcy and ruin many, and perhaps most, of the railroads of the country because of the extraordinary increases in wages and in prices of fuel and other materials during federal control. Unless railroad credit is re-established, it will be impossible for the railroads to reasonably keep pace with the growth of the country or to finance any substantial part of their requirements for extensions and betterments, generally estimated at one billion dollars annually. Let us therefore examine what Congress has proposed to date, and determine how far it meets this fundamental necessity, and what the country faces if these proposals are really as far as Congress means to go in solving the railroad problem.

Both the Senate Committee on Interstate Commerce, of which Senator Cummins is chairman, and the House Committee, of which Mr. Esch is chairman have presented bills designed to embrace all the legislation they deem necessary upon the subject. The Esch bill, after many amendments in open session of the House, was passed by that body and has gone to the Senate. The Senate did not consider either bill during the first session, but has taken up the subject in the session which has just convened. If the usual course is followed, it will substitute its own bill for the House bill, and after extended debate and probably amendments, it will pass its bill, and the differences between the two measures will be worked out in conference.

The Esch Bill in the House

The Esch bill as amended and passed by the House contains the following discouraging features:

1. The first and fundamental objection is that it bases its whole scheme of relief upon the Interstate Commerce Commission. It imposes upon the already overburdened commission the performance of many new duties and the administration of many new regulations. It creates no new agencies to assist the commission in rate matters, such as regional commissions; and it leaves the commission still burdened with the administration of the Car Service Act, the Act Relating to the Construction and Operation of Switch and Sidetrack Connections, the Act of August 24, 1912, the Safety Appliance Acts of March 2, 1893, the Act of May 6, 1910, relating to Railroad Accidents, the Safety Act of February 23, 1905, the Hours of Service Act of March 4, 1907, the Safety Act of May 30, 1908, the Act Relating to the Transportation of Explosives, approved March 4, 1909, the Boiler Inspection Act of February 17, 1911, the Act Relating to Block Signal Systems and Appliances, approved June 30, 1906, and many other duties of an administrative character having nothing to do with rates, which could be better performed by a smaller board—leaving the commission free to devote its time and talents to the making of rates and to the hearing and determining of rate cases and other important controversies. The bill adds two new members to the commission, it is true, making the membership eleven instead of nine, as at present. But it is still a single commission. And though its membership be increased and it divide itself into sections, it remains a single body, governed by the same semi-judicial rules of procedure and methods, and with the same diffused and all-embracing duties, many of which are in no wise related and require wholly different experience and talents and methods for their correct solution. It is obvious that the commission must employ subordinates, not merely to assist, but actually to decide and dispose of many of its important duties; and the bill authorizes it to do this and the commission has been doing it heretofore of necessity, even with its present duties. This is one of its defects. It is not right to put the practical decision of questions of such vast public importance upon subordinates of the commission who are unknown, who get no credit or recognition for what they do, who hold their places at the pleasure of the commission, and who receive salaries insufficient, without any certainty of tenure of office, to command the ability and experience that ought to be brought to bear in the decision of such questions. No reflection upon the subordinates of the commission is intended, for I believe them to be, individually and as a class, quite equal in ability and character to any other men in similar lines of work. But my point is that the system is not calculated to produce the wisest decisions, and that decisions by even the best of men in such subordinate, precarious, underpaid and unrecognized positions would be unsatisfactory as a rule.

All experience suggests that regional commissions and administrative boards for administrative duties, composed of members appointed by the President and confirmed by the Senate, for definite terms, and receiving fixed salaries, would be better suited to decide and dispose, subject to review by the main commission in rate cases, all these important questions, and be more in keeping with our traditions and ideals. The Interstate Commerce Commission must either leave wholly and entirely to subordinates the final decision and disposition of a great multitude of important matters, or it must devote to the review and revision of the conclusions of its subordinates an amount of time that will be seriously needed for rate questions and controversies, and its more important work. Delay in rate making and revision and in the decision of rate questions is deadly to railroad and commercial interests alike. It has been a great evil in the performances of the Interstate Commerce Commission in the past, and with the additional duties imposed by the Esch bill, it will, in my judgment, become intolerable.

2. The Esch bill, as introduced and as amended and passed by the House, recognizes that the revenues from existing rates remaining after the payment of wages and other operating expenses will be insufficient, due to conditions arising during federal control and still existing, to save many of the railroads from bankruptcy and to conserve the credit of the others. It therefore provides a guaranty for a period of six months after federal control. But this "guaranty" is illusory if not worthless. It does not provide, as one would suppose, that one-half of the "standard return" for twelve

*An article printed by the author for distribution among those interested in the railroad question.

months now paid shall be guaranteed the companies for the period of six months, but provides instead that the guaranty to each company shall be the average of the corresponding periods of six months during the test period. That is to say, assuming that federal control terminates December 31, as now believed, the bill provides that the average net earnings during the test period for the six months from January to June inclusive, rather than one-half of the earnings for the whole year, shall be taken. Now we know that the first six months of the calendar year are the worst for the railroads. The crops have been moved and the traffic is light, and during the three winter months of January, February and March, the snows are heaviest, the weather generally is the worst, and the operating difficulties are the greatest of the year, while in the Spring months of April, May and June, the maintenance work is actively resumed to repair the ravages of winter and to prepare for the heavy traffic of the late summer and autumn. As a result many railroads have deficits for the first six months of the year. Hence I say the "guaranty" tendered by the Esch bill as passed by the House, fails to meet the emergency which it recognizes and assumes to provide for.

3. The provision of the Esch bill as amended by the House with respect to the funding of amounts charged by the Government to the railroad companies for additions and betterments made during federal control is a serious menace to the credit of companies without great financial resources and strength. It requires that the amount due from the government to any company, even for rental, shall be set off against amounts incurred for additions and betterments made during federal control and chargeable to capital account, to the extent permitted under the standard contract between such company and the United States relative to deductions from compensation. Any balance due by the company with respect to additions and betterments may be funded into not exceeding ten equal amounts, one of such amounts to be payable annually beginning at the expiration of five years from the termination of federal control, with interest at the rate of six per cent per annum from date, subject to the right of the carrier to pay before maturity. Any other indebtedness existing at final settlement shall be evidenced by notes payable on demand with interest at the rate of six per cent per annum and secured by such collateral as the government may require. No progressive railroad company in a growing country such as ours, can pay for its additions and betterments out of earnings, as this act thus requires. Such expenditures are for capital account, and as such must, to a great extent if not entirely, be provided for by the issue of capital securities. Furthermore, the bill provides that even the balance which the government cannot collect by setting off the rental because of the restrictions in the standard contract, shall be founded for only five years and shall be thereafter payable in annual instalments, provided the company is able to give good security, which many of them cannot do. Funding for five years, it is true, allows a breathing spell, but the requirements that the amounts shall be paid in ten annual instalments thereafter, is a method which only financially strong companies can avail of; and such payments probably will have to be taken care of out of current income.

When it is considered that the additions and betterments were ordered by the government, and many of them to meet the emergencies of the war, and especially when there is considered the very liberal treatment accorded by the government to war industries with respect to improvements, it would seem not unreasonable to allow the railroads which need the indulgence a long term in which to pay the capital expenditures charged against them by the government while under federal control. The provision leaves the railroad companies without a dollar of working capital, with a large indebtedness to the government for equipment and for additions and betterments ordered and made by the government during federal control, with an increased pay roll of over a billion dollars a year added during federal control, confronting a scale of prices for fuel and other materials comparable with the increased cost of living for individuals, and with a rate increase insufficient to save the government itself from a huge deficit in its own operation of the railroads. Such a refunding provision certainly does not tend to the enhancement and re-establishment of railroad credit.

4. But the most amazing provision of the Esch bill as amended by the House is that with respect to labor. It effectually perpetuates every wage increase and every working rule or regulation made by the railroad administration under the stress of the world war and the abnormal conditions resulting therefrom, no matter how radically conditions may change nor how soon normal conditions of living may be restored. As reported by the committee, the bill contained an elaborate provision for a "Railway Labor Adjustment Board" and a "Railway Board of Labor Appeals" for hearing labor disputes, but no means were provided for enforcing such decisions. Where a *contract* existed, it was provided that the railroad company and the unions respectively and members advising should be liable in damages and civil actions for violation of such contract. But this would simply discourage or prevent the making of wage contracts. Strikes and lockouts were not made unlawful, and no penalties were prescribed therefor. But even this "milk and water" provision called forth the usual denunciation from the union leaders, and when the bill came up in the House, a strictly union labor amendment was adopted by a vote of 161 for to 108 against. The bill as thus amended and passed recognizes the various railroad brotherhoods and unions by name and provides for boards of adjustment composed equally of representatives of such unions and of the railroad companies, but makes no provision for enforcement of the decisions of such boards or for the decision of cases, of which there must be many, where the equally divided board cannot agree; and it does not prohibit or in any wise discourage strikes. But the most remarkable provision is that the act as thus amended makes every decision of the United States railroad administration or of the commission of eight permanent, for it says all such decisions

> "affecting questions of wages, hours of service or conditions of employment are hereby confirmed and shall apply to all carrier lines subject to this act. Decisions which have been rendered by the United States railroad administration and which apply to the individual carriers subject to the provisions of this act shall remain in effect until superseded by mutual agreement between the carrier and the employes or by decision"—

of one of the adjustment boards created by the act. Of course this provision means that no change can ever be made except in the way of further wage increases, since the requisite "mutual consent" to a reduction or modification will not be given by the unions, and will not be "superseded" by the adjustment boards, since under the act the unions have one-half the membership of each board. The same provision exists with respect to the Adamson eight-hour law. I am not advocating a reduction of wages at this time or any change in working rules and regulations, although some of them are absurdly unjust to the railroads and to the people who pay the freight bills.

But it is almost unbelievable that the House realized that by adopting this amendment it would saddle upon the country by law the railroad wage scales and working rules established under the stress of war and at a time when the cost of living and the profits of labor both were above anything known for generations, and enforce the same by the penalties prescribed in the act, while prescribing no penalties for strikes. Legislation of this sort is not likely to attract investors to railroad securities or to inspire much con-

fidence in the future provision of the transportation facilities which the country will need.

The Esch bill as passed by the House contains other provisions that will not be helpful though less objectionable; some that seem merely formal and of no particular consequence; and some that undoubtedly are wise, as for, example, giving the federal government exclusive regulation of the issue of railroad securities. But I comment only on those which in my judgment tend to defeat what I conceive to be the main object and reason for any legislation by Congress at this time, namely, the re-establishment of railroad credit to the extent necessary to enable the railroads to obtain the means required to provide the transportation facilities which the country must have.

The Cummins Bill

The bill introduced by Senator Cummins and reported by the Senate committee has the merit at least of recognizing the facts of the railroad situation and the courage of grappling with them in an honest attempt to solve the problem. It recognizes that the Interstate Commerce Commission is overburdened now with duties that interfere with its more important work of making and revising rates and deciding rate controversies. The bill, therefore, relieves the commission of various administrative duties with respect to other matters which can be as well or better performed by some other board, and confers upon it additional duties of a much more important character and provides it with the assistance necessary for the proper performance thereof. The bill also recognizes for the first time in our Congressional legislation the responsibility of the federal government to create some agency charged with the duty of promoting the establishment of adequate railroad facilities requiring it to keep an eye on transportation service and find out what is necessary to provide that which is needed, and cooperate with the railroads and the commission in bringing it about. The bill creates a transportation board composed of five members to be appointed by the President with the consent of the Senate, and charges it with the duties just mentioned, and transfers to it the various administrative duties with which the Interstate Commerce Commission is now burdened with respect to the Car Service Act, the Safety Appliance acts, the Railroad Accident act, the Hours of Service act, the Act Relating to the Transportation of Explosives, the Boiler Inspection act, the Automatic Signal act, and other acts referred to above. The bill also recognizes the danger to the whole people in the power of four men, whoever they may be and however wise, who lead the trainmen's brotherhoods, armed with a strike vote given merely to support them in negotiations, to tie up the railroad transportation of the country and to throttle the life of the nation. The bill therefore provides means for promoting the just settlement of all railroad labor disputes through tribunals created by the bill; and, this done, it prohibits strikes under severe penalties by provisions that are undoubtedly consistent with the constitution. The Association of Railway Executives has taken no position upon this question, because it relates to disputes between the companies and their employes, and it is for the public to determine what measures it will take, and how far it should go, in protecting itself against the results of such disputes, in the form of strikes or otherwise.

The Cummins bill also contains rather elaborate provisions with reference to the merger or consolidation of the railroads of the country into from twenty to thirty-five competing systems—voluntarily for seven years, and thereafter compulsorily. I do not believe the plan is workable, but as its operation is not immediate and as experience and time will demonstrate its defects before the plan becomes obligatory, it need not be discussed here.

The bill contains many other provisions of a wise and far-seeing nature, and in my judgment it would go a long way in solving the railroad problem, but for one feature, which I believe would be fatal:

The bill proposes that for the first time in the history of this country, Congress shall declare that railroad owners shall not be entitled to the earnings they may be able to save out of rates which the Government itself prescribes. Hitherto it was supposed that the duty and power of the Government were to determine the rates which the carrier should be entitled to charge and the shipper required to pay. With the rates once fixed by the Government, it was supposed that all carriers in the district could seek the business and each would be entitled to all that it could make and save through ability, enterprise, efficiency, economy and otherwise. But the Cummins bill makes a novel and radical departure by providing that no railroad company shall retain out of the earnings it my save under rates which the Government itself authorizes or approves in the manner provided in the act, more than "a reasonable return on its *property investment.*" It then proceeds to declare in effect that 5½ per cent on the "value" of the property as determined by the commission is a "reasonable" return, and confiscates all in excess of 6 per cent upon such value. But it allows the company to retain one-half of its savings between 6 and 7 per cent and one-fourth of its savings in excess of 7 per cent, to be put in a "reserve fund" until the reserve funds amounts to 5 per cent of the value of the property—the reserve fund to be drawn upon for dividends or interest in years when the savings amount to less than 6 per cent. After such reserve fund amounts to 5 per cent of the value of the property, the carrier is allowed one-third of its earnings in excess of 6 per cent.

Except these fractions, all earnings and savings of the company in excess of 6 per cent on the value of its property as fixed by the commission, are to be paid over by the company to the government within four months after the end of each year, to be used by the government.

> "in furtherance of the public interest in railway transportation by carriers subject to the act to regulate commerce, and avoiding congestions, interruptions or hindrances to railway service * * * or in furthering the public service rendered by them, either by way of purchase, lease or rental of transportation equipment and facilities * * * or by way of loans to such carriers," etc.

whatever such clause may mean.

Whether the "value" referred to in such limitation of return is the "book value" or the value which the commission is already engaged in making is not clear. In one paragraph the provision is that no carrier shall retain more than a reasonable return upon its *"property investment,"* which undoubtedly means the investment, whether good or bad, wise or foolish, and regardless of real, intrinsic or earning value. In another paragraph the provision is that the "commission shall from time to time determine the value of the property in each district and rate making group." A literal construction of these two paragraphs means that for rate making purposes by groups, the commission should determine the value, but that for limitation of earnings of individual roads, the "book value" should be the guide.

But the most extraordinary provision is that commanding that the Interstate Commerce Commission

> "shall, so far as practicable, adjust rates, fares, charges and classifications that the net operating income of the several carriers shall bear the same relation to the value of their respective properties."

That is to say, that the commission shall disregard earnings, efficiency, ability of management, economy, wise expenditures in development, location of line, volume of business, and every other consideration entering into and ordinarily

controlling relative values of properties in the every day, common sense transactions of men, and shall instead observe a rule which is never observed by anybody. To the extent of "property investment" or to the extent of "value" as determined by the commission (which, according to the tentative valuations thus far filed by the commission, means "junk" value—as so many second hand ties, rails, bridges, structures, engines, cars, etc.—and not a going *railroad*) it shall be the lawful duty of the commission under this provision to manipulate "rates, fares, charges and classifications" so that the value of a low grade, highly efficient, first located line, and the value of another line in the same group but located well up toward the top of the Rocky Mountains, with steep grades and high costs shall be equalized; and that the value of every modern and highly efficient railroad shall be equalized with the most inefficient and unprofitable railroad in the same territory! Obviously this equalization can be accomplished only in one of two ways—either by raising the value of the inefficient or reducing the value of the efficient lines. The value of the inefficient can be raised only by raising the rates to a point where sufficient net is realized or by giving them in some form a share of the savings of the efficient lines. In any case, the inevitable effect of such provision, if it be possible for the courts to regard it seriously, will be to ruin the credit of the railroads by which the great bulk of the business of the country is and must be transported. I am as confident as one can be of a legal proposition that the courts will annul the provision as confiscation prohibited by the fifth amendment of the federal constitution. But the damage to railroad credit from the willingness of Congress to enact such legislation will be irreparable.

But that is not all. The same section provides that in 1925 and in every fifth year thereafter, the commission shall determine what, under conditions then existing, constitutes a fair return, and that it may "increase or decrease the five and one-half per centum basis herein prescribed or the basis for the determination of excess income." So that the commission at such periods hereafter is at liberty under the bill to determine that 6 per cent upon the value is too high a rate, and that 5 per cent, or 4 per cent, or a lower rate is enough for a railroad investor, and that all net earnings in excess of such lower rate should be forfeited to the Government.

Is it conceivable that the money necessary to provide the railroad facilities which this growing country needs—generally estimated at not less than one billion dollars per annum—will be obtainable from investors under legislation of this sort? The whole world is borrowing—governments, municipalities, railroads, steamships, industries, mines and enterprises of every kind. The rest of the world realizes as never before that credit—fidelity to financial obligations—is something that every people must sacredly guard at all times in order to obtain means in emergencies. Opportunities for safe and profitable investments are almost unlimited and are bound to continue so for many years. Profits on industrial, commercial, financial, mining and other enterprises in our own country are unrestricted and most attractive to our investors. It is with such competition as this that railroad executives must contend for the money necessary to maintain and increase our transportation facilities. The best railroads, under the legislation proposed, could offer a return of only only six per cent on the value of their property, and even that return only in case it is earned, for, mind you, the bill does not propose that the Government shall guarantee the return. As a matter of fact, money everywhere is today worth more than 6 per cent, and the strongest railroad companies cannot sell their securities now on a 6 per cent basis. It is in the face of these facts that the bill proposes to confiscate all the company earns in excess of 6 per cent. Thus a measure designed to reassure investors and attract new capital to railroad enterprises defeats itself by discriminating against investments in the railroad business by confiscating all the rewards of wisdom in investing and efficiency in operations.

As part of the plan the same section 6 of the bill provides that

> "The commission shall initiate, modify, or adjust rates, fares, charges, and classifications, as nearly as may be, so that the railway carriers as a whole allotted to each district and subject to this act shall earn an aggregate annual net railway operating income equal, as nearly as may be, to 5½ per centum upon the aggregate value, as determined in accordance with the provisions hereof, of the railway property of such carriers in the district held for and used in the service of transportation."

Of course this includes the railroad that operates at a loss as well as the railroad that earns a surplus, the road that should never have been built as well as the most useful line, the badly managed as well as the best managed railroad, for all in the district or group must be included and rates made sufficient to yield the specified return on the "aggregate value" in the rate group. I have already pointed out that the "property investment" in one sentence of the bill is taken as the basis for limiting the return, and that in another sentence in the same section, the commission is empowered —without any guide—to determine the "value" of the railroad property. As indicated by the tentative valuation reports thus far filed by the commission, that body takes the estimated reproduction cost of the elements entering into the railroad, such as rails, ties, bridges, buildings and other structures, cuts, fills, etc., less depreciation—or what I have called a "junk" value, rather than the value as a going railroad—as its guide of value; and according to that method an unwisely built and improperly located railroad operating at a perpetual loss might be valued even higher than a wisely built and profitably operated line. But if "property investment" is to be taken as the guide, the more overcapitalized a railroad has been, the greater would be its value, for, until the bookkeeping rule was changed by the commission in very recent years, all securities issued were carried in the property investment account by most companies at par, regardless of the price received for them. It certainly will be a number of years before the commission can complete the valuation work upon which it is already engaged; and advocates of this scheme outside of Congress urge property investment as the basis of such value.

The promoters of this scheme, before it was incorporated in the Senate bill recognized that it would involve a very substantial increase in rates, and in order to lull the people into submission, they devised the plan of confiscating, in the manner and to the extent above described, the net earning of the wisely built and developed and well managed railroads in excess of 6 per cent. They assumed apparently that the controlling objection on the part of the people to an increase in rates was that some roads would be able to save more from such rates than others and more than a moderate profit. But what will it profit the shippers for the Government to confiscate the earnings in excess of 6 per cent, as proposed by this bill?

The amount is not returned to the shippers. It in no wise reduces the rates they pay. It goes into a fund for the very vague railroad purposes indicated by the provision hereinbefore quoted from the bill. The leading advocate vehemently denies that the amount is for the benefit of the weak lines. The shippers are to go on paying the high freight rates in order that the so-called "weak" lines, however inefficiently managed or improperly built, may get increased revenue in that way, but are expected to be lulled into acquiescence by the delightful reflection that the inherently

valuable and efficient railroads shall not be allowed to retain the benefit they get from the increased charges.

This assumption involves two fundamental mistakes: The first is that the people are willing to pay more than a reasonable rate in order to reward improvidence or mistakes or misfortune in locating and building railroads, or possible inefficiency in management and operation (for all the risk of these is put upon the public by the bill in dealing with *net* earnings); and the second is that the people of this country are unwilling to reward wisdom in construction and development, and efficiency in management and operation of railroads —the property in the success of which the public at large is more interested than in any other class of property existing.

I deny that our people are in favor of confiscating the net earnings of a railroad company saved by it out of reasonable rates established or approved by the Government itself. The people are interested in the rates they pay—not in what the carrier by economy, efficiency, wise foresight or otherwise, is able to save out of such rates. Our people view with complacency, and indeed approval, large earnings by well managed banks, manufacturing industries, commercial institutions and enterprises of various kinds, out of prices and rates fixed by themselves—free from regulation by the Government. How preposterous then that the people should object because some railroad companies by wise foresight and good management in competition with others should be able to make out of rates made—not by themselves but prescribed by the Government itself—a profit much less than that commonly made in other lines of business. That, too, when the people are enormously interested in the maintenance and development and increased efficiency of railroad transportation, which is a necessity for all—whereas the success or failure of the other enterprises are not matters of such vital public concern. The cloud of fiction and prejudice which has so long befogged this aspect of the railroad question is vanishing and the people are learning that, if private capital is to supply railroad facilities, it must receive as fair treatment as that employed in other and much less necessary enterprises.

It is not the weak roads that transport the country's commerce. It is not the weak roads on which the traffic becomes congested. Many of the "weak" roads are weak because they serve territories which, for various reasons, afford little traffic. But they are giving the service which the traffic justifies and requires. Some are weak because they are in competitive territory, and their rivals, through more fortunate location, or accessibility to industries, or for other good reasons, are more convenient and satisfactory to shippers and therefore able to get the business. Others are weak as a result of mistakes in policy, unsound financing or bad management; and others are weak because building in the first instance never was justified by the traffic obtainable, and was merely a speculative effort.

It has seemed almost impossible to attract sufficient attention in this connection to the supremely important fact that the country's transportation service is performed by the "strong" lines and not by the "weak." The industries are located on the strong lines; and such lines, by location and otherwise, are best adapted to the business. Their growth and development have been more in conformity with the needs of the traffic. They serve better the convenience and requirements of the people. It is the strong lines to which traffic inevitably flows, and upon which congestions occur. The congestion of traffic in 1917-1918 did not occur on the weak roads, but on the strong. Very few of the weak lines were taxed except with the overflow of traffic in excess of what the strong lines could handle. This was because the bulk of the traffic is normally on the strong lines; and this tends to make them strong. The most prominent exceptions to this are certain of the New England lines and certain large bituminous coal carriers.

Without speaking definitely from statistics, I feel safe in asserting that not less than 80 per cent of the railroad traffic of the United States in transported by railroad companies which regularly pay dividends. Their credit depends upon the continuance of such dividends. Their stocks are held by hundreds of thousands of individuals—many representing the savings of almost a lifetime. Unless such dividends are continued—and indeed practically assured—it will be impossible for these companies, so situated as to be called upon to handle the great bulk of commerce of the country, to obtain the money for improvements and development required to meet the needs of our growing commerce. It was the commission's policy of stationary and inflexible rates in the face of increasing wages and other operating costs, and the conflicting regulations of the various states, that made investors anxious about the stability and continuance of dividends, and deterred many of the strong railroads from making the improvements, additions and extensions which all now know to be necessary. The fact undoubtedly is that it is the strong roads upon which the bulk of the business naturally falls that need the additional facilities, and it is the strong roads whose credit must be conserved if such facilities are to be provided.

Hence I protest against the confiscatory provisions of section 6 of the Senate bill, as not only failing to provide for the transportation emergency confronting the country, but as making it infinitely worse by attacking for the first time in the history of this Government—not the transportation rates to be charged the shipper (which the Government may and ought to prescribe) but the *net* saved out of such rates, which is as much the private property of the stockholders as the money and assets in the treasury, and by seeking to bring the valuable and the worthless, the important and the unimportant, and the efficient and inefficient railroads to a dead level.

To base rates upon "property investment," as advocated by representatives of some of the "weak" lines, or upon the separate appraisement of the different elements entering into the construction and making up the physical structure, as seems to be the method thus far adopted by the commission in its valuable work, undoubtedly will require radical changes in the rate structure and the rate relations now existing, which represent growth and commercial needs for generations, and to which commerce is adjusted. And it is a false and wholly arbitrary basis.

Further increases of freight rates undoubtedly are necessary, as the Government's own experience with the railroad shows. No well informed person expects railroad wages to be materially reduced under existing conditions; and the prospect of material reductions in the prices of fuel and other supplies for many months is certainly not encouraging. Added to this must be the expense of traffic organization and soliciting agencies incident to a restoration of competitive conditions, which were not necessary during federal control. Hence large deficits from operations—like those suffered by the Government—confront nearly all the railroad companies unless freight rates are further increased very substantially.

The practice and only effective method of making such increases is to take the rates as they exist and base upon them such increases and adjustments as may be necessary to meet the increased wages of labor, the increased cost of material and other operating expenses and taxes, and provide a return on the new capital that has been put into the properties in such enormous amounts and which must be provided for the future. The commission should be left free to consider new rates from time to time, so as to adjust the revenue to the changing expense of operation, the rise and fall of wages and prices, and the expenditure for new capital. So far as it becomes necessary to consider the value of the railroads: the average earnings during a series of years, taking into

account the conditions then existing, plus a fair return on the new capital expended for betterments, additions, equipment and extensions, is economically and in sound common sense the rule that ought to be followed.

A railroad is legitimately worth nothing to its owners except what it can earn and pay in the way of interest and dividends. True, earnings depend in large measure upon the rates a carrier is allowed to charge, and these rates in turn may be fixed by the government so long as they are not confiscatory. But our railroad rates have been under Congressional regulation since the creation of the Interstate Commerce Commission in 1887. Since 1906 at least, the commission has had power and has effectually exercised it, to reduce rates when found too high, and railroad earnings have been open to the commission and the public. No one can justly claim that our railroad rates as a whole, or in any substantial territory, or on any important line, have been too high. The fact is that they have been too low. Under this system, railroad values have worked themselves out. Railroads that could earn net returns have demonstrated their ability, and those that had little earning capacity have been disclosed—all under rates for which the government is responsible. The securities of all these roads have been bought and sold at prices based upon their demonstrated earning capacity, and are today held by those who bought at such prices. The prices of these securities are the evidence of popular judgment of the relative value of these railroads—as one compared with another—and these values were based upon net earnings made under rates that the roads were allowed by law to charge. The government should not, and consistently with fair dealing cannot, question the value of the railroads as demonstrated through many years by rates established by or under the regulation of its own agencies. New money has been put into the properties by investors for additions, betterments and equipment, thus increasing the transportation facilities—which it would be the duty of the government itself to provide, if not furnished by private capital; and much of this capital has been too recently invested to be yet reflected in increased earnings. It is upon such considerations as these, with the values established under earnings from rates prescribed or sanctioned by law for years, that rates should be based, and not upon "property investment" or upon the value of so many second-hand ties, so many second-hand rails, bridges, structures, etc., etc.

One point more: Both the Senate bill and the House bill recognize the obvious necessity for increases in railroad rates, and contemplate immediate application therefor by the carriers to the Interstate Commerce Commission, in the meantime continuing to a greater or less extent—as already pointed out—the present guaranty for five or six months, within which it is assumed such increases may become effective. But both bills carefully refrain from preventing any state railroad commission or legislature from immediately reducing state rates, thereby depriving the carrier of revenue which the government itself has been collecting during federal control. More than that, such changes in state rates generally affect interstate rates and often disturb a wide and important interstate rate structure. Often a railroad company will not dare to increase an interstate rate unless it knows that a corresponding increase will be made in a competitive state rate. How will the railroads be able to carry out the increases which both these bills contemplate until they know what will be done by the state commissions with respect to state rates?

True, both bills give the Interstate Commission the power to review all state rates which affect interstate rates. But the Senate bill provides that before the commission shall hear or dispose of any such issue, it shall cause the state to be notified of the proceeding; it requires that the commission "shall confer with the authorities of any state having regulatory jurisdiction," etc., with respect to the relation between rates, fares, charges, classifications, regulations or practices of carriers, etc.; and also "to hold joint hearings with any such state regulatory bodies on any matters wherein the commission is empowered to act where the rate making authority of the state may be affected by the action of the commission." It is only "after full hearing" that the commission may make any order removing interference of the state rate. It is obvious that the delay in the adjustment of such differences under the provisions of this bill would be disastrous to railroads suffering for revenue. The provision of the Esch bill upon the subject is much to the same effect, but admits of more prompt action with respect to the matter by the Interstate Commerce Commission than is possible under the provisions of the Senate bill.

Foremen in Mechanical Department Classed as Officers

BECAUSE OF the exceptional importance of the work of supervisory foremen in the mechanical departments, and the fact that economical and efficient shop operation depends so largely upon their efforts and co-operation, W. T. Tyler, director of the Division of Operation, has issued a circular letter to the regional directors stating that it is desired that their classification, working conditions and privileges be made definite and uniform.

To that end the director general directs that general foremen, roundhouse foremen, departmental formen and assistants will be classified as officers and will be given consideration and advantages attaching to officers of similar rank in other departments, as follows:

(A) Reasonable period of time lost on account of sickness without loss of pay.

(B) Two days off each month for all salaried foremen whose tour of duty consists of seven days per week.

(C) Two weeks vacation a year with pay for all salaried foremen who have acted as officials continuously for one year or more.

(D) Privilege of resigning instead of being shown as discharged or dismissed.

(E) When charged with an offense likely to result in dismissal, a hearing to be given by a superior officer other than the immediate superior, at which hearing the foreman in question may be represented or assisted by any other foreman whom he may select for that purpose.

(F) Card transportation to be granted to all salaried foremen, the extent of such transportation to be based on the general practice for other division officers and the importance of the position the foreman occupies.

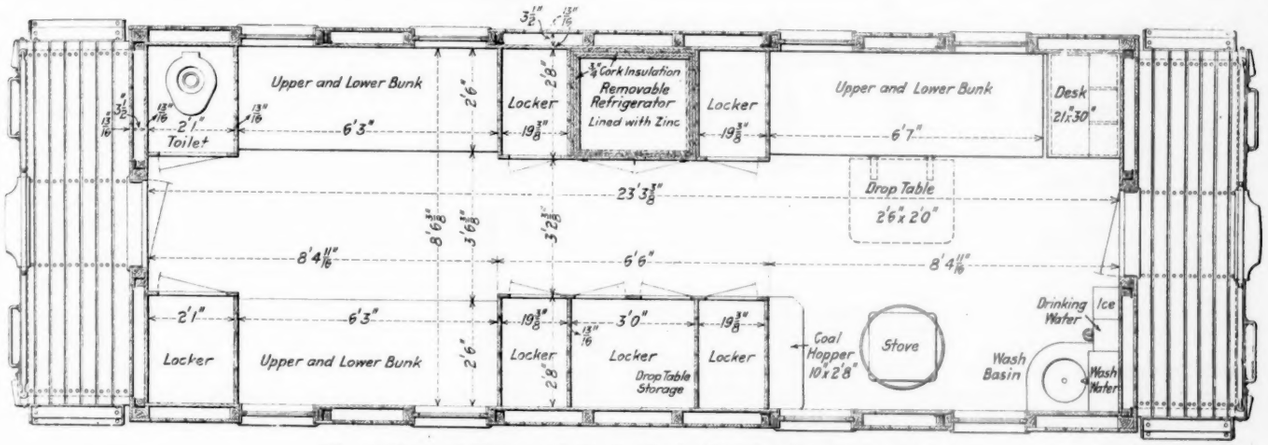
The letter says: "It is not possible to lay down a definite seniority rule because ability and merit are of paramount importance in this highly responsible work and, in any event, must govern, but where the ability and merit of two men are equal, the choice of positions on a division should, as far as practicable, be determined upon the basis of seniority. I am sure that the uniformity brought about by the above rules will result in more loyal and efficient service by the foremen affected and will reduce complaints to a minimum. Will you please take necessary action to have this put in effect in your region at once."

THE CALIFORNIA RAILROAD COMMISSION has extended to October 1, 1920, the time in which the San Diego Electric Railway may dispose of the bond issue of $4,478,000 authorized by the Commission in October, 1914.

Approved Standard Design for Caboose Cars

Railroad Administration Issues General Drawings for Caboose Cars of the Composite Type

A STANDARD DESIGN for railroad caboose cars has been prepared and is recommended by the Railroad Administration for general use in the future construction of such cars in the United States. The laws of the various states, many of them conflicting regarding the construction of caboose cars, make it desirable to have a standard design that will meet the legal requirements of any of them. The proposed design is offered by the Railroad Administration in the hope that the railroads will conform to a general design and thus gradually eliminate cabooses of weak construction or faulty design. The proposed design is a 24-ft. caboose of the composite type, having a steel underframe and superstructure, with wood outside sheathing and interior finish.

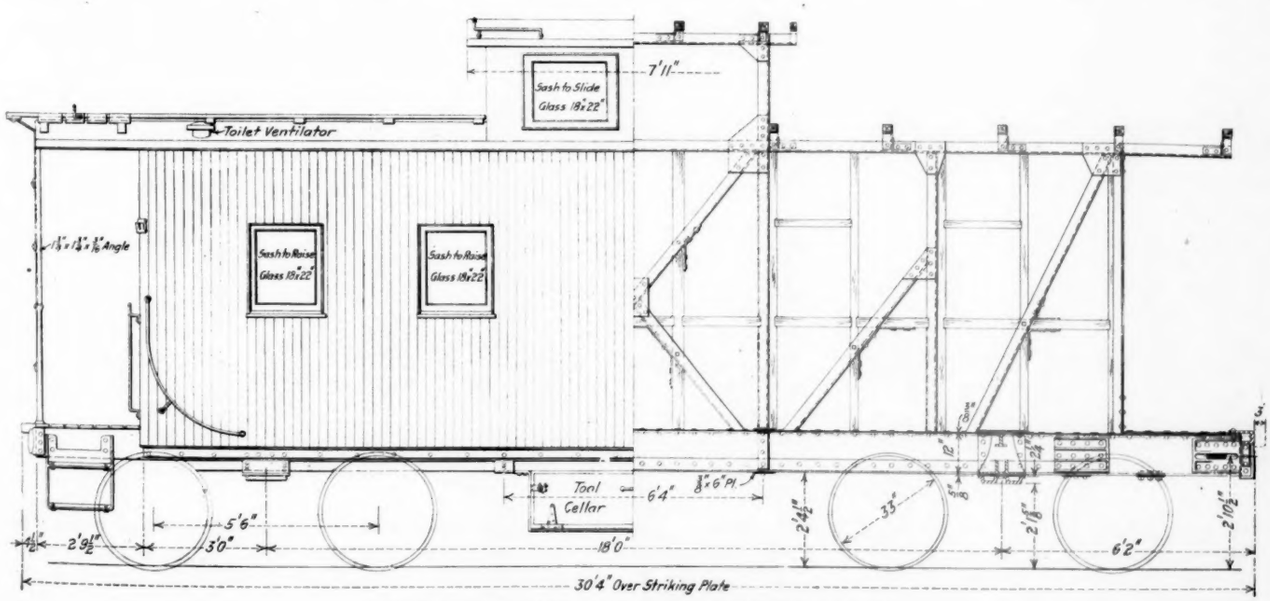


Floor Plan of Proposed U. S. R. A. Standard Caboose Car.

The body framing is built up of 3-in. by 3-in. by 5/16-in. angles, the side and end posts being adequately braced by angles of the same size and with gussets of ¼-in. steel plate securely riveted at the side sills and top plates and at intermediate points on the side posts.

The Superstructure

The carlines are of the composite type, with 2½-in. by 2½-in. by 5/16-in. angles, formed to a 24-ft. radius and secured by rivets to the side top plates. The cupola frame is constructed of 3-in. by 3-in. by 5/16-in. angles, with the same type of carline that is used on the main body framing. The roof may be a canvas or plastic covering over roof boards



Side Elevation of U. S. R. A. Standard Caboose Car.

secured to the carlines. Wooden filler posts and plates are secured to the angle iron frame, and to these the 13/16-in. inside and outside sheathing is secured.

The floor space is 23 ft. by 3⅜ in. by 8 ft. 6⅜ in. inside of the sheathing, with a clear space of 3 ft. 2⅜ in. at the closest

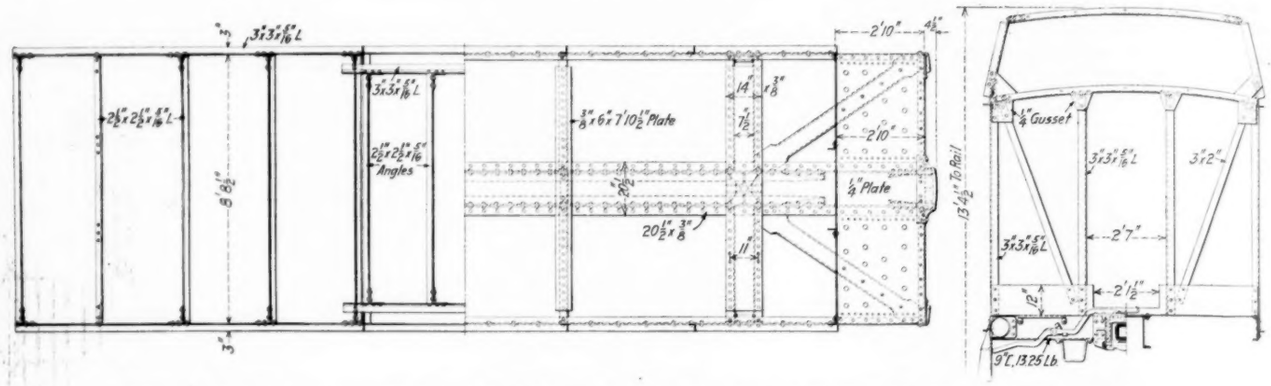
point in the aisle between the interior fittings. Two upper and two lower bunks, 6 ft. 3 in. by 2 ft. 6 in., and one upper and one lower bunk 6 ft. 7 in. by 2 ft. 6 in. are conveniently located. The upper bunks fold upward against the carlines, giving ample headroom above the fixed lower bunks, which can be used as seats when not in use for sleeping purposes. The conductor's valve, train indicator and air gage are located in the cupola, and seats are provided in each side of the cupola for observation purposes. The headroom in the main body of the car is 7 ft. and in the cupola 9 ft. 2 in. A desk is provided, so located that one end of a lower bunk serves as a seat. The tank for wash water, the wash basin and a drinking water tank are conveniently arranged in one corner of the caboose. A refrigerator, numerous lockers and drop tables, a toilet and a coal stove for heating the car complete the equipment.

There are four windows in each side of the car (18 in. by 22 in. glass) which may be raised; there is a window having a glass area of 10 in. by 28 in., with an upper drop sash, in the door at each end, and four windows with sliding sash having glass 18 in. by 22 in. in the cupola. The floor consists of 1⅜-in. rough flooring, a half-inch layer of cork covered with a waterproof paper, and a 13-16-in. top flooring. A platform of ample width, formed of ¼-in. steel plate with wooden cleats laid crosswise of the car, is provided at each end. The roof canopies over the platform, thus giving some protection from the weather. Handholders, ladders and steps are placed in the most convenient locations. A ratchet hand brake is applied and provision made for the application of a back-up signal whistle at both ends of the car. The uncoupling apparatus is connected by a chain to the platform rail, so that the car may be uncoupled without leaving the platform.

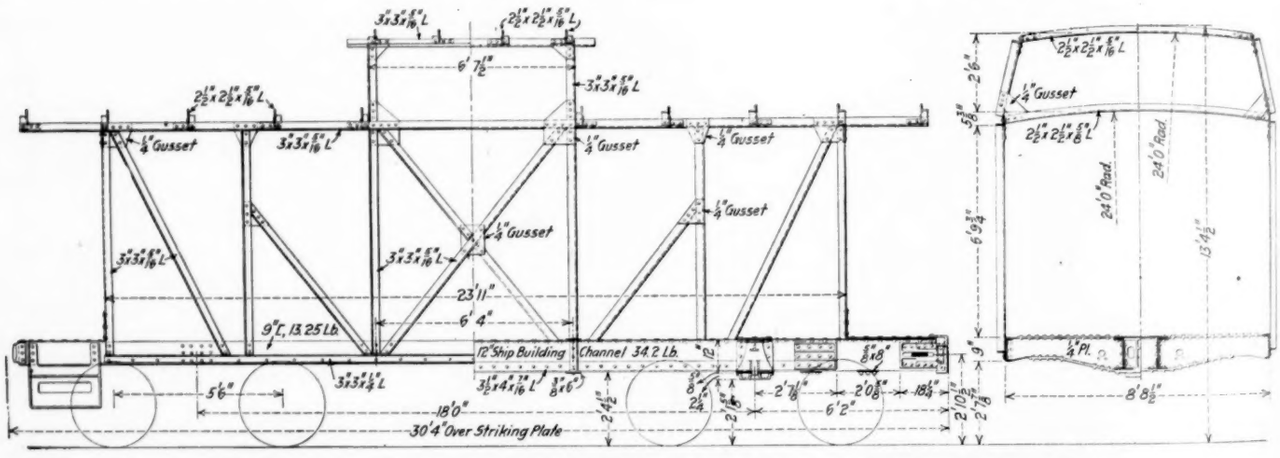
The Underframe

In order to withstand the severe service in which many cabooses are used, where there are heavy grades and pusher service, the underframe is of unusually strong construction. The center sill is built up of 12-in. 34.2-lb. shipbuilding channel, with a 3½-in. by 4-in. by 7/16-in. angle riveted to the bottom inside edge of the channel for the entire length of the sill. The top cover plate is of ⅜-in. steel plate 20½ in. wide. The side sills and end sills are made of 9-in. 13.25-lb. channel section, the side sills being reinforced on the outside with a 3-in. by 3-in. by ¼-in. angle, which also serves as a support for the side nailing strips. The body bolster diaphragms are formed of ¼-in. pressed steel plate, with a 3-in. flange. The top bolster cover plate is of ⅜-in. and the bottom cover plate of ⅝-in. steel plate, both 14 in. wide. The two intermediate crossbearers are of ¼-in. pressed steel plate, with a ⅜-in. steel top and bottom cover plate 6 in. wide. Diagonal braces at each end give additional rigidity to the underframe, and it should meet the requirements of the most severe service. The draft sills are designed to permit the application of any of the standard draft gears. A tool cellar of ample size is secured to the underframe.

The car trucks recommended by the Railroad Administration are of the four-wheel type, with cast steel bolsters and side frames, and have a 5-ft. 6-in. wheel base. The



Plan of Underframe and Plan and End View of Body Framing of U. S. R. A. Standard Caboose Car



Side Elevation and Cross Section of Steel Frame for U. S. R. A. Standard Caboose Car

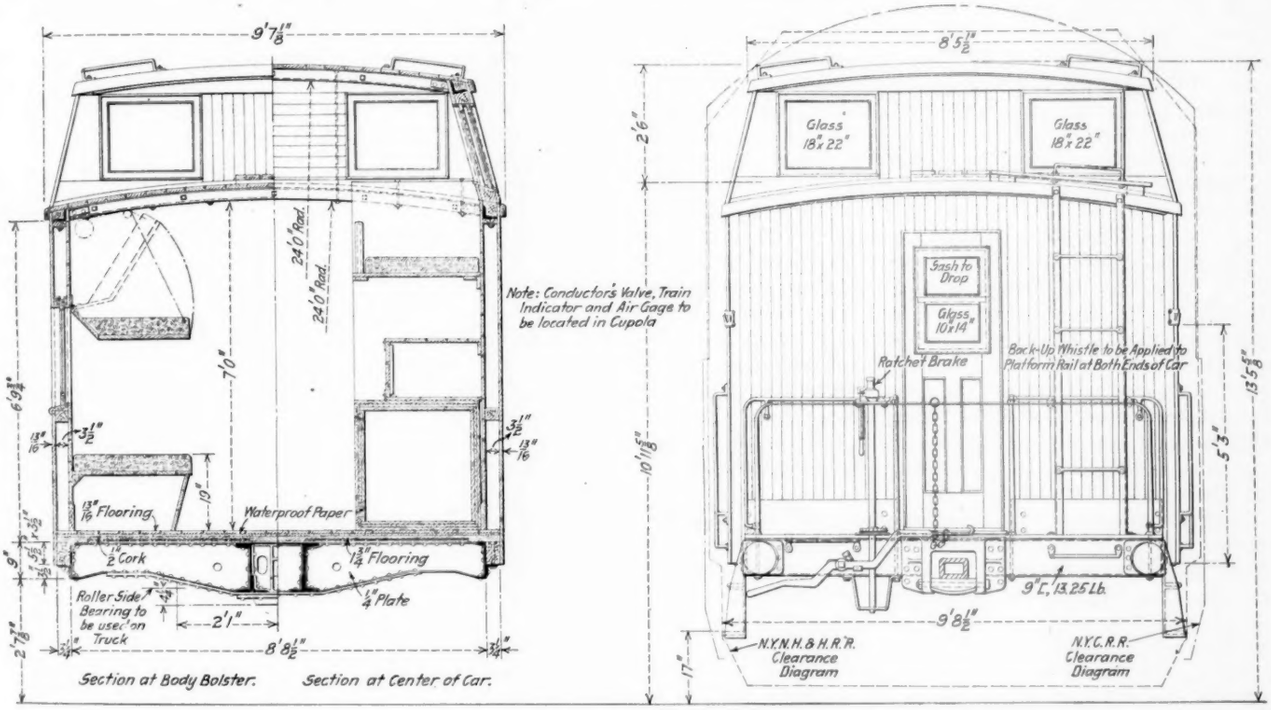
wheels are 33 in. in diameter, mounted on axles having a 4¼-in. by 8-in. M. C. B. journal.

General Data

Length over striking plates	30 ft. 4 in.
Length over body framing	24 ft. 0 in.
Width over body framing	9 ft. 2½ in.
Width over side sills	8 ft. 8½ in.
Height from rail to top of main roof	11 ft. 1 in.
Height from rail to top of cupola roof	13 ft. 4½ in.
Diameter of truck wheels	33 in.
Wheel base	5 ft. 6 in.
Distance center to center of trucks	18 ft. 0 in.

This design is made to conform to the laws of all of the states except those of Missouri, which differ radically from those of the other states. It is intended to prevent the agitation of railway employees for state laws which, if adopted, might make it impossible in such states to use cabooses that are lawful in other states and would result in the poorest cabooses collecting in those states having no stringent laws on the subject.

No attempt has been made by the Railroad Administration to specify all of the details of construction, but only to provide a general design for common use by the various railroads.



End Elevation and Cross Sections of Steel Frame for U. S. R. A. Standard Caboose Car

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Economic Resources of Poland.—The first number of the Polish Economic Bulletin, which is being issued by the Commission Internationale de Ravitaulement, gives a large amount of information as to the economic resources of Poland, from which it appears that in 1913 the yearly production of the oil industry was 1,632,000 tons. The output of coal was 58,006,000 tons, and that of manufactured iron was nearly 1,600,000 tons.

The California Railroad Commission, in its annual report, recently issued, says that steam railroads earned approximately $135,620,000 in California during 1918, as compared with $125,250,000 in 1917. In 1918 they paid out in operating expenses, exclusive of taxes, approximately $104,920,000 in California, as compared with $81,400,000 in 1917. The net operating revenues in 1918 is reported at about $30,700,000, as compared with $43,850,000 in 1917. Annual financial reports of 62 steam railroads were filed with the Commission during the year.

Weekly Traffic Report

According to a report on traffic conditions for the week ended December 8, 1919, made to Walker D. Hines, director general of railroads, the revenue freight loadings and receipts from connections for the various regions were as follows:

Eastern region—Revenue freight loaded, 180,085 cars, as compared with 177,612 for corresponding period last year; receipts from connections, 229,759, as against 227,108 in 1918. Allegheny region—Revenue freight loaded, 163,965, as compared with 171,068 in 1918; revenue freight received from connections, 149,295, as against 160,736 in 1918. Pocahontas region—Revenue freight loaded, 39,507 for the week ended December 4, 1919, an increase of 1,770 over preceding week; received from connections, 16,051, a decrease of 104 cars over last week. Southern region—Revenue freight loaded, 107,573, an increase of 2,556 over last week; received from connections, 77,087, an increase of 9,077 over last week. Northwestern region—Revenue freight loaded, 104,350, a decrease of 39,289 under last week; received from connections, 65,503, a decrease of 2,227 over last year. Central Western region—Revenue freight loaded showed a 5 per cent decrease as compared with last year; receipts from connections, 60,762, an increase of 8 per cent over last year. Southwestern region—Revenue freight loaded, 54,251, as against 46,093 last year; receipts from connections, 49,308, an increase of 9,557 over last year.

A summary of the report follows:

Eastern region—Freight traffic has begun to be affected to a considerable extent by the coal situation, which has already interfered with the improvement that has been going on in traffic to and from iron and steel industries. Reports from Chicago and Chicago junctions show the Eastern region received 81,522 cars coming from the East during the month of November, compared with 63,069 November, 1918; 95,671 loaded cars forwarded to the East, compared with 95,794 last year. In view of the bunker coal situation traffic control managers have been instructed that export freight

only is to be transported in vessels of the United States registry. Total carloads of export freight at New York other than bulk grain and coal, 11,532; about 1,500,000 bushels of grain in elevators or boats and about 525,000 in cars. Arrangements have been made for considerable cut in passenger train and car service, but it is, of course, impossible to say as yet what the effect will be in the amount of travel.

Allegheny Region—Conditions with respect to the coal distribution have changed in the past week, which should permit of a greater run of empty equipment through the Pittsburgh gateway. Blast furnaces in the region during the week ending November 29 had 107 stacks in blast, 84 being out of blast, an increase of 2 as compared with last week. The strike of bituminous coal miners continues, and there is noted a falling off in the production as compared with the preceding week. Full car supply has been maintained the entire week in the anthracite and bituminous fields. Coal dumped at tidewater piers decreased 94,312 tons, and there is a reduction of 243 cars under load in terminals. Coal dumped at lake ports reflected an increase of 21,228 tons, with a reduction of 140 cars held under load. During the week ending November 29, which covered the Thanksgiving period, passenger travel was exceedingly heavy.

Pocahontas Region—Tidewater coal dumping decreased 2,071 tons under last week. General movement increased 3 per cent over last week and 8 per cent over same period last year. The movement of coal and coke continues above normal, although the increase over previous week is not so pronounced or in the same ratio as the increases of the past few weeks. Loaded cars from connections also show some improvement. All in all, the past week was generally satisfactory and car supply was ample, Passenger travel normal; earnings, however, show a considerable decrease over November, 1918, figures.

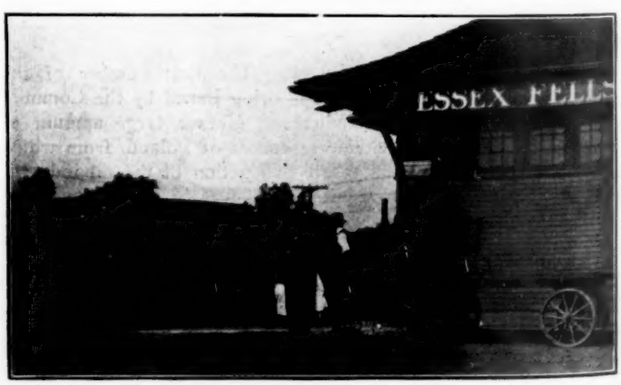
Southern Region—The total number of cars handled shows a decrease of 10,487 cars under last week's figures. Grain and grain products decreased 14 per cent, live stock 13 per cent, coal and coke 41 per cent, ore 2 per cent. As compared with last week, grain and grain products decreased 17 per cent, live stock 20 per cent, ore 16 per cent, and miscellaneous traffic 10 per cent, while coal and coke increased 14 per cent. There was some increase in the number of furnaces in blast in the Gadsden district. The cotton mills are operating on full time and receipts are largely in excess of those of last year for the same period. Passenger travel has been very good for the week. Tourist travel increasing. There has been some reduction in the volume of passenger travel, due to restricted service and the apparent disposition on the part of some to avoid travel during the coal shortage. The total, however, shows a slight increase over last year.

Northwestern Region—The reduction in loading by non-essential industries was responsible for a decrease in revenue loading, which, while below that of last week, was a slight increase over same period last year. General business conditions continue good, but the coal strike and severe weather conditions during the past week have curtailed movement somewhat. So far few industries have had to restrict their operations on account of shortage of coal, but it is expected that a large number may be affected the coming week. Merchandise movement continues in good volume, while Christmas stock is moving in large quantities. With the exception of refrigerators, for which there is a heavy demand throughout the region, the car situation shows some improvement. During the week 11,451 cars of coal were loaded, all of which consisted of dock coal. Cars are being furnished for this loading in preference. The light movement of iron ore represents the season's clean-up, and the few vessels now loading will take all that is in the docks.

Central Western Region—The week ending December 2 shows a heavy decrease in coal and ore loading, which resulted in a 5 per cent decrease in the loading of all freight as compared with last year's figures for same period. Coal production in the region, about 23 per cent of the output of November last year. No change from the previous week is noted in the supply of empty equipment, but cold weather and storm conditions will tend somewhat to slow up the movement of empty cars. The wheat acreage sown in New Mexico this year is reported as being 35 per cent greater than last year. From present indications the total citrus crop to be moved from California this season will amount to over 40,000 cars. Passenger travel for the past week has been very heavy, and considerable extra equipment was required during the Thanksgiving day period. The heavy movement to California continues, necessitating the running of double sections on nearly all trains.

Southwestern Region—Considerable improvement has been made in moving sugar from Louisiana, and the accumulation due to light car supply during the first few days the refineries were in operation is being rapidly disposed of. With the exception of the usual movement of lignite coal from Texas mines which has not been interfered with, coal mining is practically at a standstill. Some coal is, however, being taken out of strip pits in the Pittsburgh district of Kansas by volunteer miners. During the week railroads in this region have been working under instructions to furnish 75 per cent car supply for movement of cotton from compresses and, due to the necessity for affording further relief, instructions have now been issued to furnish 100 per cent. Refrigerator equipment is being provided to protect the winter vegetable movement, which will increase from now on. Regular passenger travel was heavy during the week; adequate equipment was in all cases provided. There is in prospect very heavy travel during the Christmas holidays, and arrangements are being made with a view to giving the operating department advance notice of the traffic to be moved, so that adequate equipment can be provided.

Fuel Situation—The decreased production over last week owing to the Thanksgiving holidays, combined with the increased requirements of certain industries, made necessary further restrictions in the distribution of coal, so that now distribution is strictly confined to very essential industries. All foreign flag bunkering has been discontinued, while the bunkering of American flag ships is by license. In the West the situation is more complicated because of the long haul in transporting coal from the Allegheny and Pocahontas regions. Car supply is excellent, the weak spots heretofore noted in this respect having been overcome.



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The Morristown & Erie Uses a Motor Bus on Rails Between Essex Fells, N. J., and Morristown

The Senate Debate on the Cummins Railroad Bill

The Senators Show a Marked Interest in Learning the Sources of Various Propaganda

WASHINGTON, D. C.

DEBATE ON THE CUMMINS railroad bill was resumed in the Senate on Monday, December 15, with a plan for holding night sessions in an effort to expedite the passage of the bill during the week and under a notice served by Republican leaders that unless a vote is taken on the bill during the week it will be necessary to postpone the holiday recess proposed to begin on December 20. An unexpected amount of opposition to the bill had developed during the preceding week which raised some doubts in the minds of those who were trying to pass it as to whether the bill will be approved by the Senate unless it is radically modified, but efforts have been made to induce those advocating amendments to permit the bill to be passed in order that the differences may be threshed out by the conferees who will be appointed to reconcile the differences between the Senate and House bills and it was believed that the fear of losing the holiday recess might bring about a favorable vote on the bill. A very large number of amendments touching almost all phases of the bill have been submitted.

Senator LaFollette on Saturday resumed and concluded his speech in opposition to the bill, which had continued with some interruptions throughout the week, after which Senator Norris of Nebraska created a diversion by demanding an investigation of alleged propaganda on behalf of the railroads to bring about the passage of the bill. Senator Norris referred to the plan which has been announced by the Association of Railway Executives for a campaign of national advertising to begin shortly for the purpose of placing fundamental facts regarding the railroad situation before the public, but he interpreted it as being designed to promote the passage of the Cummins bill, notwithstanding the fact that a large number of the railway executives are strongly opposed to the bill. He presented a resolution, which was referred to the committee on interstate commerce, instructing that it make an investigation "for the purpose of ascertaining to what extent there has been organized in the country a propaganda to influence Congress in the passage of S. 3,288 * * * and particularly to ascertain the amount of money that has been expended and that it is contemplated to expend for such purposes by the Association of Railway Executives and to what extent such associations or others representing other railroads, or directly or indirectly representing the security holders, are using the newspapers of the country in an advertising propaganda for the purpose of bringing about the passage of said bill."

Senator Pomerene demanded that the scope of the resolution be broadened when it comes before the committee to include the propaganda being conducted by the Plumb Plan League against the bill. Senator Norris said that if any one thought that any other propaganda in connection with the bill should be investigated he would be glad to see the resolution amended to that end.

"I have reached the conclusion," Senator Norris said, "that there is quite a propaganda going on at the present time in the country with reference to the pending railroad bill. While I am not complaining of that and while I fully concede that all citizens or any group of citizens interested either for or against this or any other legislation have a perfect right to pursue any honorable means to advance their interests and have them placed on the statute books if possible, I think when such propaganda is apparent that the people ought to know just what is being done, how it is being done and, if possible, what it costs. I am offering the resolution and saying what little I shall say in connection with its presentation in that kind of a spirit. I am not complaining that the propaganda is wrong or that it is illegal, but I think the people of the country ought to know, if possible, who is behind it, who is interested in it and what it is costing."

Senator Norris then read from a copy of what purported to be an advertisement, signed by Thomas De Witt Cuyler, chairman, and a list of members of the Association of Railway Executives, headed as follows:

"To the American People:

"It is the declared purpose of the United States Government to restore the railroads at an early date to the control of their owners.

"The Association of Railway Executives represents those upon whom at that time responsibility will again rest for the prompt and succesful movement of the country's commerce.

"Those constituting this association are keenly conscious of their accountability to the public.

"They have accordingly determined to present as fully as they can the fundamental facts and considerations which they themselves must face in their efforts to provide satisfactory railroad service.

"It is hoped to engage the interest of the whole American people, whose welfare is so vitally dependent upon adequate transportation.

"The country can grow only as the railroads grow. The railroad problem must be solved—and solved rightly and soon—if our country is to prosper.

"It is to promote that prosperity—permanently and in the interest of the whole people—that railroad executives will present to the public the situation as they see it."

"I think that is a fair and honorable statement," said Senator Norris, "and I am not finding fault with what is said. I do not want any one to get that idea. I think, however, that the propaganda will go much further and that its indirect influences will be much greater than is outlined by the plan suggested in the paper which I have read. I take it that it is an advertisement that is going into the newspapers of the country."

He also read from an article by Frederick M. Kirby, which said that the railroads are about to spend a million dollars in six weeks "to educate the people and all the legislative and governmental officials of the United States" and "to inspire legislation favorable to private operation," and that the million would be spent before the end of December. He also read a resolution said to have been adopted at a conference of farmer and labor delegates at Chicago on November 21 and 22 stating that the authors of the resolution were reliably informed that the railway security holders have urged an active propaganda campaign through the press to cost over "ten million dollars" to secure the enactment by Congress of legislation to put into effect "the security holders' plan for the return of the railroads." The resolution did not state whether or not this plan had any connection with the million dollars to be spent by the railway executives.

Senator Norris also presented a statement by Benjamin C. Marsh, secretary and director of legislation of the Farmers' National Council, that he had been shown a quarter page copy of an advertisement to be issued by the Associa-

tion of Railway Executives and informed that the contracts for placing the advertisements were in the hands of Thomas F. Logan & Co., New York City, and that if he desired to get any advertisements for the Farmers' Open Forum he should communicate with that agency. Mr. Marsh was informed that the railroad executives were planning to spend "hundreds of thousands and perhaps millions of dollars" in this advertising "to educate the people of America on the railroad situation." He had also been informed of contracts for these advertisements having been signed with the Newspaper Enterprise Association, but it had not yet received its copy of the advertisements. Senator Norris then called attention to the fact that Thomas F. Logan had testified during an investigation conducted by the Senate Agricultural Committee about a year ago to having received large sums from the packers and other large corporations for services in connection with advertising and publicity work.

Senator Pomerene said he had no objection to the resolution, but he would go a little further and would like to know the source of the propaganda against the bill as well as that for it. "I think," he said, "there has been some propaganda in favor of certain other proposed legislation which probably have been more satisfactory to the security interests, but when the so-called Plumb plan was presented it was heralded throughout the country that a fund of four million dollars was to be raised to defeat this legislation and to promote the so-called Plumb plan and secure its enactment. It seems to me that fairness to the public requires that there should be an investigation on both sides so that we may know who it is that is back of a proposition which requires the purchase of all the railroads of the country at the public expense, to be turned over to a certain class of employees."

Senator Norris said he had not heard of such propaganda but would join with the Senator in amending the resolution or helping to pass any other resolution to cover any other propaganda with relation to the bill.

"I recognize the fact that there is certain propaganda for or against any legislation that comes up before the Senate," said Senator Pomerene. "I am constantly receiving, as no doubt the Senator is, communications by wire and by letter demanding in the interest of the public that I vote either for or against certain legislation, all of which is inspired by lobbyists here in the city of Washington. I like to know what is going on and I like to see the wheels going around when it comes to propaganda either for or against any legislation. It is very interesting."

Senator King remarked that he had received many thousands of petitions and statements "demanding" that he shall vote for the Plumb plan, but that he had received only perhaps 10 or 15 in favor of either the Cummins bill or the Esch bill.

The amendment offered by Senator Myers to strike out the provisions for representation of the employees and of the public on railroad boards of directors was rejected on December 15.

An amendment offered by Senator Poindexter was adopted providing that where no agreement has been made by a carrier with the government for compensation, the President shall pay to such carrier the total amount of the standard return in all cases where such amount may be necessary to pay the interest upon bonds or other indebtedness of such carrier and such payment shall not deprive the carrier of the right to present its claim for additional compensation, to be determined as provided in the act.

Senator Thomas offered an amendment which was adopted providing that if any part of the bill shall for any reason be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not effect, impair or invalidate the remainder of the act.

Senator Spencer of Missouri offered an amendment which was adopted after some discussion, providing for the creation of a special board of adjustment to pass on differences between subordinate officials and railroad companies concerning complaints, grievances and disputes, including questions of discipline and controversies arising in ordinary operation. The board would be composed of four members representing subordinate officials and four representing the carriers, organized in the same manner as the boards proposed for the adjustment of controversies with employees. The term "subordinate officials" is defined to mean those heretofore classified as such by the Railroad Administration which, Senator Spencer said, includes train despatchers, traveling auditors, yardmasters, claim adjusters and investigators, roadmasters, storekeepers and others of that class. Senator Cummins said the committee would assent to that amendment because, while it had intended to make the provisions of the bill applicable to all classes of employees, the language probably would not be construed to include the subordinate officials.

Discussion as to Return of Roads

The question of whether the railroads ought to be returned on January 1 aroused a lively discussion in the Senate on December 15 after Senator Lenroot had made a speech advocating his plan for a single railroad corporation not directly owned by the government, but under federal control and opposing the anti-strike provision of the Cummins bill. He said the railroads ought not to be returned until April or May and that if they were retained for that period the Senate would have more opportunity to consider the question. He said it did not seem possible that the President would take any such responsibility as that of driving the major portion of the railroads into bankruptcy, but he did not know what the President might do. Senator Smith of Georgia, said he had heard quite a number of senators say they are not satisfied with the bill and not ready to vote on it. He believed they would vote against it at the present time and he thought that a more satisfactory conclusion could be reached if the bill were allowed to go over until January. Senator Cummins pointed out that the Senate committee has been studying the railroad question for at least two years and that this bill was reported on October 23.

"The Senate will never be in a better position to consider the railroad question than now," he said. "The members do not usually give close, undivided study to a subject until it is imminent. I am sure that senators all have opinions with regard to it and to the general subject. It is of the highest concern that the bill be disposed of very soon for if it is not disposed of this week nothing will excuse senators, I think, from staying here and considering it during the holidays. I cannot with complacency think of having the disposition of this bill, or any other bill upon the subject, go over until after the first of January. If the bill were laid aside senators would lay aside the subject and would not take it up again until the bill came before the Senate."

Senator Smith said that, of course, if the railroads are to be turned back to their owners on the first of January without any legislation the situation would be very bad, but he could not think that possible. He thought the railroads ought not to be turned back before the middle of the spring.

Senator Watson said that some months ago the President had stated in unequivocal terms that he expected to return the railroads on the first of January. Since then there has emanated from the White House no statement to show that the President has altered his purpose or changed his intention. He thought it was incumbent upon the Senate to enact such legislation as will save the railroads from conditions that will inevitably result if they are turned back without legislation. Senator Smith retorted that he did not think

the Senate responsible for the situation which the railroads are in. He thought those upon the committee might well communicate with the President and "let him understand the labor of this work which is put upon Congress without any help from those who put it upon Congress."

Senator Watson replied that in company with Senator Kellogg he had visited the director general of railroads and asked him what the President intended to do about the railroads, whether they would be returned on the first day of January with or without legislation. Mr. Hines responded, he said, that he had placed the matter before the President, that he had made a report as the President had requested and that he had offered a suggestion, although he did not volunteer to state what the suggestion was, and that as soon as the President signified what his intention was he would let the senators know. They returned four or five days later and sought to ascertain whether or not he had received an answer, in order that Congress and the railroads might know precisely what the intention of the President is, but there had been no response.

Inasmuch as there has been nothing to negative the assertion that the President made some time ago, Senator Watson thought the Senate was warranted in believing that they will be returned whether legislation is passed or not. Senator Smith pointed out that the President had given no formal announcement by proclamation of the time the roads would be returned. Senator Cummins referred to a letter written by Mr. Hines to himself and to Chairman Esch of the House committee saying that it was impossible for the government to continue in the operation of the railroads unless Congress were willing to fix a definite time in which it would be sure that government operation would continue and to make the necessary appropriations.

"The director general," he said, "cannot make contracts, or hesitates to make contracts that must be made for supplies for the coming year. There must be millions of ties bought and they ought to be bought now, because they should be taken out of the woods in the winter."

Senator Smith asked whether the railroads are making such contracts.

"Certainly not," replied Senator Cummins. "The railroads cannot make such contracts. They neither have the money with which to pay for supplies nor do they know when the railroads are going to be returned to their owners. The railroads are utterly powerless to do anything. There ought to be 20,000 refrigerator cars ordered now in order to get them next summer, when they will be absolutely needed. The director general does not feel that he ought to put that burden upon the carriers if the property goes back immediately and the carriers are utterly incapable of doing it for themselves. There has been no contract made for rail replacements. Everyone knows that it is necessary to have a large volume of rails for use during the coming year. They cannot be had unless they are ordered months in advance and there is nobody to order them. The situation is really most distressing. I cannot understand how senators are willing to postpone the passage of some kind of legislation for a single day."

Senator Smith asked if the railroads ought not to have a formal notice before the railroads are returned and if it is not also true that they are not ready to take their property back on January 1. Senator Cummins replied that if a railroad bill has passed at that time or if it is reasonably certain that within a month after the first of January a railroad bill will become a law, the roads can be turned back with perfect safety and there will not be a jar. "If, however, they are turned back without any prospective legislation and with the known habit of Congress to delay everything until the necessity becomes obvious to even the most indifferent mind, then there will be paralysis. There will be chaos."

Senator Watson quoted from the President's message to Congress on May 20, in which he said: "'The railroads will be turned over to their owners at the end of the calendar year; if I were in immediate contact with the administrative questions which must govern the re-transfer of the telegraph and telephone lines I could name the exact date for their return also.'"

"There," he said, "is a straight, square, unconditional assertion that the railroads will be handed back to their owners at the end of the year. The President has never stated anything to the contrary and yet the railroads have not been in any position to prepare themselves for receiving their property because they have not known whether the roads would be turned back, inasmuch as there were certain statements emanating from the Railroad Administration which led the railroad men to believe that the roads would not be turned back on the first of January."

Senator Cummins interjected that the Senate is not responsible for the Railroad Administration nor for the President. "I assume," he said, "that each of those functions will perform its duty according to the way it sees its duty. What we have to do is to perform the duties of Congress so far as the Senate takes a part in legislation. Now we have a duty.

I supposed it was the desire of a very large majority of the Senate and of the Congress, too, and I know of the people of the United States, to relieve the Railroad Administration of the operation of the railroads. If there is any one thing upon which the people of this country are united, it is that the railroads ought to be returned to private management and operation. If there is any dissent from that opinion except among certain employees of the government, I have not heard it now.

Now, our duty is to put the railroads back in private management if we believe they ought to be in private management and that is what this bill does. This bill does not wait upon the President or the director general to determine when government operation shall cease. This bill declares that it shall cease at the end of the month in which the bill becomes a law and if I understand the temper of the people of this country, that is what they want. They want the roads returned and the management of the railway corporations regulated by the laws, but we cannot return them and answer that sentiment of the people of the country until we pass some such bill to protect not only the interests of the carriers but the interests of the public as well, for if the roads should be returned without effective legislation they could exist about a month and then they would fall into hopeless confusion and two-thirds of them would be in the hands of receivers."

At the evening session on December 15 a number of minor amendments to the bill were adopted. Senator Curtis of Kansas, offered an amendment providing for a guarantee to short line railroads taken over by the Railroad Administration and subsequently relinquished to the extent of any actual operating deficit that may have been incurred since January 1, 1918. He said he had in mind particularly the Kansas City & Northern, which had made a net profit of $17,000 a year before it was taken over, but that the administration took over the road, handled it for a time, refused to make a contract, took possession of and retained its terminals, directed the movement of its cars, took its coal and diverted its freight, with the result that the road finds itself in debt from $300,000 to $400,000 and has ceased operation. This led to considerable discussion of the short line situation in which Senator Kellogg argued against opening the door to every railroad that was taken over and then turned back again. He said the bill proposes to give such roads the same six months' guarantee as is given to other roads, but that to extend the guarantee back to 1918 would make it necessary for Congress to take care of a large number of roads that have not been particularly affected by government operation.

The amendment was allowed to be printed and held over for further consideration.

Amendments

Senator Walsh of Montana offered an amendment which was adopted, providing that any railroad proposing to undertake any work of new construction may apply to the transportation board and be granted permission to retain for not over 10 years all or any part of its earnings from such new construction instead of being required to contribute to the general railroad contingent fund. The senator said this amendment was offered in the conviction that the bill as reported does not offer sufficient inducement to hold out the hope that there will be any further railroad construction. He would not believe that anyone would be quite willing to put money into new railroad construction being assured beforehand that the only return which can be secured is the equivalent of 6 per cent with an additional one-half per cent on earnings between 6 and 7, and one-third of earnings over 7 per cent. He said it would be better to buy Liberty bonds at their present depreciated price.

Senator Stanley of Kentucky proposed an amendment to strike out the provision of the bill relating to labor and wages, and spoke for two hours on the question, but had not concluded when an adjournment was taken to the following day, and Senator Stanley withdrew his amendment.

Senator Jones of Washington offered a series of amendments, which were adopted, reducing the jurisdiction of the Interstate Commerce Commission over waterways for the purpose, he said, of avoiding interference with the jurisdiction of the Shipping Board. One amendment provided that the act shall not be construed to affect, diminish or interfere with the power or jurisdiction of the United States Shipping Board over water transportation or otherwise. Senator Jones said he did not want to give the Interstate Commerce Commission power to regulate the rates of water carriers on the inland waterways. They ought to be perfectly free. The other amendment proposed by Senator Jones inserted the word "inland" before waterways in the section directing the transportation board to inquire into water transportation facilities, etc.

Senator Watson offered a series of amendments which were adopted, to exempt street, suburban and interurban electric railways which are not operated as a part or parts of a general steam railroad system of transportation from the proposed plan of consolidation. The language of the bill exempted "street railways and interurban railways whose chief business is the transportation of passengers."

Senator Spencer of Missouri offered an amendment which was adopted, providing that the restriction against the commissions requiring a railroad to embrace in a through route substantially less than its entire length shall not operate to hinder or prevent the commission establishing or maintaining a through route where one of the carriers is a water line.

Senator Gay of Louisiana offered an amendment providing that the proposed consolidation of carriers and the rule for the adjustment of rates shall not be construed to apply to or affect belt line railroads and terminal facilities owned, exclusively and operated and controlled by any state or political subdivision thereof, but after some discussion it was withdrawn for the purpose of perfecting it.

Senator Calder offered an amendment which was agreed to, making it unlawful for a carrier to provide a shorter period for giving notice of claims than 90 days, for the filing of claims than four months, and for the institution of suits than two years, to be computed from the day that notice in writing is given by the carrier that it has disallowed a claim.

Senator Sheppard of Texas offered an amendment which was adopted, to provide that nothing in the act shall change or limit the present liability of common carriers as it exists under common law and by statute.

Senator Jones also secured the adoption of an amendment exempting water carriers from the provision relating to regulation of security issues. Senator Poindexter offered an amendment to the long and short haul clauses to omit the provision for relief on the authority of the Interstate Commerce Commission, which was allowed to go over until the following day.

An amendment by Senator Kenyon, intended to make it clear that claims for reparation and for unjust and unreasonable charges during federal control shall be filed with the commission and that the commission shall continue to have the same jurisdiction which it has had heretofore in that respect, was adopted without discussion.

Senator France of Maryland offered an amendment which was rejected, prohibiting a railroad from refusing to furnish equal and identical rights, accomodations and privileges in interstate transportation on account of "race, color or previous condition of servitude."

An amendment by Senator Calder of New York to extend the jurisdiction of the Interstate Commerce Commission to the transportation of natural gas was rejected. The senator urged the amendment on the ground that cities in New York had no control over the gas supply which came from Pennsylvania and that if they attempted to reduce the rates the gas companies could refuse to send the supply into New York and he wanted some tribunal to have control over the situation. Senator Cummins and others pointed out that the commission could only regulate the transportation of the gas through the pipe lines and not its price, but the senator thought it would be useful to have somebody exert some control.

Agreement with Brotherhoods on Time and one-Half for Overtime

THE PRINCIPLE of time and one-half for overtime in road freight service, which was demanded by the brotherhoods in 1916, waived in the negotiations preceding the passage of the Adamson eight-hour law and since reiterated in connection with the demands made by the brotherhoods upon the Railroad Administration, has finally been conceded by the Railroad Administration with some modifications and offsets by way of concessions made by the brotherhoods and has been made effective as to slow freight service as of December 1.

On November 15 announcement was made that the Railroad Administration, in discharging its responsibility to make readjustments necessary to avoid unjust inequalities in compensation of different classes of railroad employees, had proposed to the four brotherhoods representing the train and enginemen that, in order to give additional measure of compensation to the train service employees in the slow freight service, time and one-half would be paid for time required to make runs in excess of what would be required if an average speed of 12½ miles per hour were maintained, provided, however, that arbitraries and special allowances previously paid in various forms of freight train service are eliminated for the railroads as a whole. At the same time it was announced that the proposal thus made had been taken under consideration by the representatives of the train and enginemen's organization with a view to consideration and further discussion.

Following the consideration of this proposal by the representatives of the train and enginemen's organizations, conferences have been held between such representatives and the representatives of the Railroad Administration with the result that a final agreement has now been reached. Under this agreement, which was announced on December 15, time

and one-half for overtime will be put into effect as of December first affecting employees in slow freight service. Under the settlement all arbitraries and special allowances formerly applicable between terminals are eliminated. Special allowances for switching and similar work at initial terminals are preserved but at the former rates. Allowances for switching and delays at the final terminals are preserved payable at the former rates where the work is performed prior to the overtime period. These allowances have been agreed to in the past for relieving men of work which has not been considered a part of their regular duties and correspondingly it is felt that the same conditions existed in connection with the payment of time and one-half for overtime.

The former announcement stated that it had been estimated that the proposed rule would add about $36,000,000 a year to the payroll unless it was possible to reduce the amount by reducing the overtime.

Representatives of the brotherhoods stated that the proposed elimination of arbitraries and special allowances would largely offset the money value of the time and one-half rule and after a conference of their committeemen at Cleveland, a committee including the officers of the four brotherhoods came to Washington for a further conference with Mr. Hines to ask for a further interpretation of his proposal regarding the elimination of arbitraries and special allowances. After several conferences with the director general and members of his staff a compromise has been reached as outlined above.

Progress of Alaskan Railroad

IN HIS ANNUAL report to the President Franklin K Lane, secretary of the interior, discusses the progress made in the government railroad in Alaska in part as follows:

"One of the first recommendations made by me in my report of seven years ago was that the Government build a railroad from Seward to Fairbanks in Alaska. Five years ago you intrusted to me the direction of this work. The road is now more than two-thirds built and Congress at this session after exhaustively examining into the work has authorized an additional appropriation sufficient for its completion. The showing made before Congress was that the road had been built without graft; every dollar has gone into actual work or material. It has been built without giving profits to any large contractors, for it has been constructed entirely by small contractors or by day's labor. It has been built without touch of politics; every man on the road has been chosen exclusively for ability and experience. It has been well and solidly built as a permanent road, not an exploiting road. It has been built for as little money as private parties could have built it, as all competent independent engineers who have seen the road advise.

"The road has not been built as soon as expected because each year we have exhausted our appropriation before the work contemplated had been done. We could not say in October of one year what the cost of anything a year or more later would be, and we ran out of money earlier than anticipated. It has not been built as cheaply as expected because it has been built on a rising market for everything that went into its construction from labor, lumber, food supplies, machinery, and steel to rail and ocean transportation. I believe, however, it can safely be said that no other piece of government construction or private construction done during the war will show a less percentage of increase over a cost that was estimated more than four years ago.

"The men have been well housed and well fed. Their wages have been good and promptly paid; there has been but one strike and that was four years ago and was settled by department of labor experts fixing the scale of wages. The men have had the benefit of a system of compensation for damages like that in the reclamation service and Panama canal. They have had excellent hospital service, and our camps and towns have been free of typhoid fever and malaria. That the men like the work is testified by the fact that hundreds who came out the past two years, attracted by the high wages of war industries, are now anxious to return to Alaska.

"There has been but one setback in the construction and that was the washing out of 12 miles of tracks along the Nenana river. This is a glacial stream which, when the snows melt, comes down at times with irresistible force. In this instance it abandoned its long accustomed way and cut into a new bed and through trees that had been standing for several generations, tearing out part of the track which had been laid.

"The work of locating and constructing the road has been left in the hands of the engineers appointed by yourself. The only instruction which they received from me was that they should build the road as if they were working for a private concern, selecting the best men for the work irrespective of politics or pressure of any kind. As a result, we have a force that has been gathered from the construction camps of the western railroads, made up of men of experience and proved capacity. That they have done their work efficiently, honestly, and at reasonable cost is my belief.

"It is not possible during the construction of a railroad to tell what it costs per mile because all the foundation work, the construction of bases from which to work, the equipment for construction, and much of the material is a charge which must be spread over the entire completed line. The best estimate that can be made today as to the newly constructed road is that it has cost between $70,000 and $80,000 per main-line mile, or between $60,000 and $70,000 per mile of track.

"This cost per mile includes the building of the most difficult and expensive stretch of line along the entire route from Seward to Fairbanks—that running along Turnagain Arm, which is sheer rock rising precipitously from the sea for nearly 30 miles. There are miles of this road which have cost $200,000 per mile. Even to blast a mule trail in one portion of this route cost $25,000 a mile.

"The only government-built railroad — that across the Isthmus of Panama—cost $221,052 per mile. The only two recently built railroads in the United States are the Virginian, built by H. H. Rogers, which cost exclusive of equipment $151,000 per mile, with labor at from $1.35 to $1.75 per day and all machinery, fuel, rails, supplies at its door, and the Milwaukee line to Puget Sound, which is estimated as having cost $130,000 per mile exclusive of equipment.

"The work has been conducted with its main base at Anchorage, which is at the head of Cook's Inlet. This point was chosen as the nearest point from which to construct a railroad into the Matanuska coal fields. That was the primary objective of the railroad, to get at the Matanuska coal. From Anchorage it was also intended to drive farther north through the Susitna Valley and across Broad Pass, and to the south along Turnagain Arm toward the Alaska Northern track. To secure coal for Alaska was the first need. So in addition to Anchorage as a base, one was also started at Nenana on the Tanana river from which to reach the Nenana coal fields lying to the south. If these two fields were open, one would supply the coast of Alaska and one the interior. This program has been acted upon, with the result that the Matanuska field is open to tidewater with a down grade road all the way. The Nenana road has been pushed far enough south to touch a coal mine near the track, which may obviate the immediate necessity for reaching into the Nenana field proper.

"There is an open stretch across Broad Pass to connect

the Susitna Valley with the road coming down from Nenana. This gap closed, there will be through connection between Seward and Fairbanks."

The report of the Alaskan Engineering Commission says:

During the fiscal year ending June 30, 1919, the following work on the Alaska Railroad was accomplished:

Considerable rehabilitation work on the old Alaska Northern Railway, from Seward (mile 0) to mile 70.

Thirty-eight miles of grading between mile 227 and mile 265 was practically completed; also the greater part of the grading for the 36 miles between mile 417 and mile 453 was completed.

Seventeen miles of rail were laid between mile 74 and mile 91; also 26 miles between mile 365 and mile 391; also 3 miles between mile 414 and mile 417; also 6 miles between mile 453 and mile 459—a total of 52 miles.

Location surveys were continued between mile 265 and mile 365 over the Broad Pass region.

The bridge over the Talkeetna river at mile 227 was completed.

Approach to dock in Anchorage harbor was practically completed.

Necessary maintenance of sections of the line in operation was attended to.

Fifty-five thousand three hundred and ninety tons of coal were mined at the two government mines in the Matanuska field.

During the year work was seriously hampered through lack of funds caused by the delay in the passage of the deficiency and sundry civil bills until July. Such a handicap is not expected to recur, as the bill authorizing the appropriation of $17,000,000 (in addition to the $35,000,000 originally appropriated) for the completion of the government railroad was passed by Congress in October. Six million dollars of this amount has been appropriated for the fiscal year ending June 30, 1920, and it is expected that the balance of the $11,000,000 will be appropriated as it may be needed.

Since June 30, 1919, and prior to the time that this report went to press, grading has been completed and track laid from mile 417 to mile 453, thus connecting Nenana and Fairbanks; also about 10 miles of rail has been laid north from Talkeetna at mile 227; also such progress in the construction of the dock at Anchorage has been made that the largest steamers now dock there.

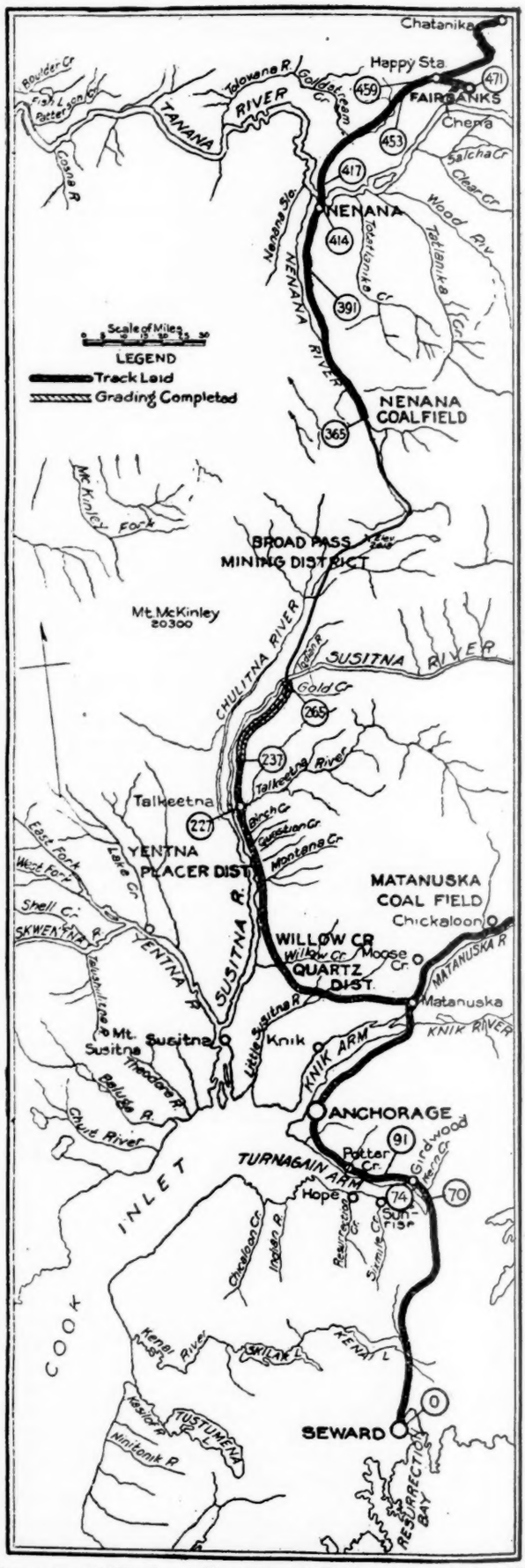
The work which remains to be done includes the following:

Completion of the rehabilitation of the Alaska Northern Railway, including construction of snowsheds and enlarging of tunnels.

Construction of line from mile 237, ten miles north of Talkeetna, to mile 365, five miles north of Nenana Canyon. This is now the only gap in the line from Seward (mile 0) to Fairbanks, mile 471, with the exception of the bridge at Nenana, crossing the Tanana river, and a permanent bridge at mile 373 over the Nenana river. Completion of the dock at Anchorage.

Col. Frederick Mears, shortly after his return from France in July, was appointed chairman and chief engineer of the Alaskan Engineering Commission. Wm. C. Edes has been appointed consulting engineer.

"Devil's Basin," near Roundup, Mont., on the line of the Chicago, Milwaukee & St. Paul, is the locality from which comes the latest report of prospectors striking oil, and a rush of oil seekers has already set in. But whether or not the new development is a large one or merely a small pool, is a point on which the owner of the "basin" has not yet given out information which can in any way be considered satisfactory.



Progress of Work on Government Railroad in Alaska, 1919

Scientific Development of the Steam Locomotive*

Means of Securing Higher Efficiency in the Generation, Distribution and Utilization of Steam

By John E. Muhlfeld

Part II

IN RELATION to boiler feedwater observations and experiments indicate that any scale porous to water has little effect on boiler economy. However, such scale when dried out or hardened next to the metal by the expulsion of the carbonic acid, as usually occurs when boilers are forced, will not only become an excellent heat insulator and cause a heat loss of about 10 per cent when ⅛ in. thick, but it exposes the sheets and staybolts to overheating and "mud burning," with resulting leakage and shopping for repairs and cleaning.

In the preparation of recent data on the expense resulting from bad water supplied to steam locomotives on eight divisions of a large Eastern trunk line, the cost averaged $1,000 per locomotive per annum for fuel, repairs, time out of service and boiler washing, with specific cases of mud burning costing as high as $400 for repairs and time out of service only.

In view of the increasing size of locomotive boilers and the high ratings to which they are subjected, the importance of purifying unsuitable water to prevent incrustation, corrosion, leakage and burning, as well as to eliminate delays and cost for cleaning, repairing and extra fuel consumed, cannot be overestimated, and until the many existing conditions of this kind are corrected, neither the existing nor improved steam locomotives can be expected to render satisfactory and economical service.

Boiler Feedwater Purifying

When an adequate and suitable supply of boiler feedwater cannot be obtained from the usual sources, then the proper treatment of the available unsuitable water becomes necessary by settling; filtration; chemical treatment in treating plants, supply tanks or tenders; or, in the case of suspended matter and carbonates, by partial purification in a combination open and closed type of exhaust-steam feedwater heater on the locomotive.

While the supplying of suitable natural or treated boiler water to the locomotive tender is the most satisfactory and economical method, in the absence of such the tender treatment or feedwater-purification method will be an improvement over feeding the raw water into the boiler without treatment, or attempting to treat it in the boiler.

Fuel

The principal fuels now used in steam locomotives are the commercial grades of bituminous and anthracite coal and fuel oil. While millions of tons of the by-products of anthracite and bituminous coal mining are available, as yet practically no progress has been made in their utilization although satisfactory means and methods are now developed. This applies as well to the enormous deposits of sub-bituminous coal and lignite that are only awaiting mining operations to come into effective and economical use as locomotive fuel.

Regardless of the kind of fuel now used by steam locomotives, more general attention is being given to its proper preparation for the class of service to be performed and the method of firing to be followed, before it is supplied to tenders. However, the factors of kind and size of coal and method of firing must each be carefully considered and co-ordinated in order to insure the best results.

With the cost for locomotive fuel on tenders practically doubled during the past two years, and next to labor the largest single item of railway operating expense, the best methods for its use will now begin to receive the consideration that this large item of operating cost justifies.

Combustion

The locomotive fuel bill for the year 1918 was approximately $750,000,000, and while full recognition is given to the fact that from 25 to 50 per cent of the available energy in the fuel is still needlessly wasted and that present methods of mechanically firing, as compared with the average hand firing, and burning coal on grates or in retorts increase this waste, but little has been accomplished in regulating combustion so that this loss may be reduced.

The capacity of the average steam-locomotive boiler is dependent upon the activity, temperature and radiation of combustion, which in turn are usually controlled by the limitations of combustion when fuel is burned on grates, the furnace volume and evaporating surfaces, the length of the boiler flues, tubes and bafflewall arrangement, and the draft, and not so much upon the inability of the evaporating and superheating surfaces to absorb the heat.

TABLE 1. CONSUMPTION OF DRY BITUMINOUS COAL BY LOCOMOTIVE WITH THE BEST HAND FIRING.

Total indicated horsepower of locomotive.	Dry coal per i. hp.-hr.
500	2.8
750	2.7
1000	2.6
1250	2.5
1500	2.6
1750	2.8
2000	3.0
2250	3.2
2500	3.4

The combustion rate generally follows the increase in draft until about 100 lb. of bituminous and about 50 lb. of anthracite coal are burned per square foot of grate area. After this the additional coal supplied is not effectively consumed due to the difficulty in supplying sufficient air, uniformly distributed, through the grates and fuel bed to oxidize the fixed carbon and volatile matter in process of combustion without a large excess of air such as obtains when forcing takes place, and it becomes necessary to open the fire door so that combustion can be completed by the admission of air above the fuel bed.

The greatest loss in heat is that due to the heat carried off in the stack gases, sparks and cinders, which usually results in a smokebox temperature of from 500 to 750 deg. F. for the best practice. Adding to this the heat losses due to combustible in ash, vapors of combustion, carbon monoxide and otherwise, leaves an average of from 25 to 40 per cent of the heat in the fuel as fired unabsorbed by the boiler and superheater.

Where locomotives are worked at from 25 to 35 per cent cut-off and hand-fired, with a thermal efficiency of about 65 per cent for the combined boiler and superheater,

*The first section of Mr. Muhlfeld's paper, which was presented at the annual meeting of the American Society of Engineers, appeared in the *Railway Age* of December 12, page 1139.

the heat balance will be approximately as shown in the following table.

However, at high rates of boiler capacity and draft, when stoker-fired coal is burned on grates the front-end and stack cinder and spark losses will run as high as from 12 to 25 per cent, the carbon monoxide from 2 to 7 per cent, and the unburned fuel from 10 to 35 per cent. With the best hand firing, when using dry bituminous coal averaging 14,400 B.t.u. and 60 per cent fixed carbon, 32 per cent volatile and 8 per cent ash, the fuel rates in Table 1 will usually obtain.

	Per cent
Heat absorbed by boiler	55
Heat absorbed by superheater	10
Heat loss in smokebox gases	14
Heat loss in cinders	8
Heat loss in vapors of combustion	4
Heat loss in combustible in ash	3
Heat loss in carbon monoxide	2
Heat loss in radiation and unaccounted for	4
Total	100

As compared with hand firing, stoker firing will result in an increase of from 10 to 25 per cent in the fuel fired, while if the same coal be pulverized and burned in suspension there will be a decrease of from 15 to 25 per cent in the amount of fuel fired.

As the locomotive firebox, which in the best practice represents only from 7 to 10 per cent of the total boiler evaporating surface, must generate all and absorb from 30 to 40 per cent of the heat energy that is converted into drawbar horsepower, the fuel effectively consumed, not fired, is the measure of work done. Therefore the largest permissible combination of fire box and combustion-chamber volume, heating surface and grate area should be provided and equipped with an arrangement of firebrick baffle walls placed on water-circulating supports in a manner to produce long flame travel, high firebox temperature and the maximum radiant heat for absorption by the surrounding water.

With the usual limitations in firebox volume, too much importance cannot be placed on the arrangement of heat-absorbing and radiating walls for the purpose of flame and radiant-heat propagation. Carefully conducted tests have shown that the best results are obtained from solid firebrick baffle walls and that the unburned-gas, coal-dust, spark, cinder and smoke losses are reduced with an increase in their length and gas-passage arrangement, and a saving of from 10 to 15 per cent in bituminous coal as fired is effected.

The greatest difficulty in controlling combustion occurs at high horsepowers and long cut-offs, where grates are used, and for the best results the air openings should be equal to about 50 per cent and those in the ashpans to about 15 per cent of the total grate area so that firebox temperatures of from 2,000 to 2,500 deg. F. can be obtained and the unburned solid fuel, carbon monoxide and excess air over the fuel bed reduced to the minimum.

Other important factors influencing combustion, as well as evaporation and superheating, that should receive consideration are: ratios of length to diameter of boiler flues and tubes and the spacing between them; distribution of gas area between boiler flues and tubes; the effect of closed superheater dampers on firebox draft when locomotive is not using steam; free passage of gases through front end by elimination of unnecessary baffles, steam pipes and superheater parts; arrangement of exhaust stand and nozzle to change form of exhaust jet and produce greater entrainment of gases and improved co-ordination of exhaust jet and stack.

As with any pulverized coal of 12,430 B.t.u. value, an average boiler efficiency of 69.2 per cent at 1080 boiler hp., and an average combined boiler and superheater efficiency of 78.1 per cent at 1220 boiler hp., with an equivalent evaporation averaging 42,100 lb. of water per hour from and at 212 deg. F., has already been obtained on a Mikado simple-cylinder type of locomotive hauling fast freight trains over a 113-mile division, the possibilities for reducing the steam-locomotive fuel consumption are practically unlimited and much remains to be done in this direction by good hand firing, through a combination of the fireman's eyes, brain and brawn, provided the thermal efficiency of the modern locomotive at the drawbar is brought up to where it should be.

Boiler Water Circulation

Water is practically a non-conductor of heat but expands when heated above 39 deg. F. and rises due to its relatively lower specific gravity. Unimpeded circulation will therefore increase its ability to take up heat, maintain greater uniformity of temperature throughout the boiler, and decrease the liability of incrustation of heat-absorbing surfaces and of priming.

In designing a boiler it is extremely desirable to secure the most rapid circulation practicable, as with high combustion rates and temperatures and the abnormal state and behavior of the water film in contact with the heating surfaces, the load on the firebox sheets is very intense, the conduction rate averaging from 75,000 to 100,000 B.t.u. per square foot of evaporating surface per hour.

Therefore, in order to avoid resistance to heat transfer, with resultant overheating of metal and reduced efficiency, a relatively high velocity of circulation and at least a rate of 125 ft. per min. in the most sluggish locality is very essential.

The average locomotive boiler, with its combination of cylindrical and box shell, water legs, staybolts and rods, flues, tubes and generally irregular design of water spaces does not present ideal water-circulation possibilities, but the enlarging of contracted spaces, increasing of water-leg, flue and tube clearances, and provision of suitable outlets from choked water pockets will not only reduce the resistance to the "slip" of the steam bubbles through the water, but will enable the accelerated action of the former to increase the velocity of the latter and thereby improve general circulation and heat-transfer results.

Heat Radiation, Convection and Conduction

The transmission of the heat of combustion produced in a locomotive boiler is by means of radiation and convection to the firebox, flue, tube and superheater heating surfaces, by conduction to the water in the boiler and the steam in the superheater, and by convection through the boiler water and the superheater-steam mass. In addition there are the direct radiation losses, which in many instances are considerable.

Heat Radiation. In a locomotive boiler the efficiency of combustion heat transfer through the firebox plates and boiler flues and tubes is from 20 to 25 per cent greater as applying to those heating surfaces directly affected when subjected to the radiant effect of the incandescent combustible and non-combustible particles which have passed through the minimum distance, than the heat-transfer efficiency when convection only is available. For example, when coal is hand or stoker-fired and burned on grates or in retorts the radiant heat is at a minimum and applies only to the heat-absorbing surfaces adjacent to the fire bed while the heat of convection is at a maximum; whereas when the coal is burned in pulverized form in suspension this condition is reversed, as is evidenced by the intense incandescent flame which obtains not only in the furnace and combustion chambers of the firebox proper, but well into the boiler flues and tubes. The locomotive boiler of the future will undoubtedly depend more largely on radiant heat.

With respect to the loss of power through radiation to the atmosphere from all parts of locomotive boilers and machinery that are generators and containers of heat and pres-

sure—to prevent which rather indifferent efforts have as yet been put forth, as the rate at which this loss of heat extends will depend upon the difference between the temperature of the body emitting the heat and the temperature and velocity of the surrounding atmosphere, there is sufficient justification for completely and properly lagging the boiler, firebox, cylinders and heads, steam chests and all other radiating surfaces, as well as for polishing certain machinery parts, in order to reduce the dissipation of heat that now takes place through these parts from the existing steam pressures and superheat.

Heat Convection. In the locomotive boiler convection acts particularly in the transfer and diffusion of the heat in the products of combustion throughout the firebox, flues, tubes and superheater by means of the smokebox draft and in the carrying of the heat through the boiler-water mass by the currents produced by circulation. In the present locomotive boiler by far the greatest proportion of the heat is imparted to the evaporating and superheater surfaces by convection.

To secure the fullest benefit from heat convection the combustion volumes and gas areas must be so co-ordinated as to establish a "velocity pressure" or "frictional" action between the gases and the heat-absorbing plates and tubes in order to increase the rate of heat transmission. Likewise must the boiler circulation be expedited in order to quickly disengage and release the steam bubbles from the water side of the same plates and tubes in the final heat transfer. The possibilities for improving heat transmission by convection in the locomotive boiler with its high water rate, *i. e.*, a boiler horsepower for an average of less than two square feet of total evaporating surface, fully justifies additional study.

Heat Conduction. In the locomotive boiler heat conduction is principally associated with the thermal conductivity of the firebox, flue, tube and superheater materials and with the accumulation of soot and scale on the fire and water or steam sides, respectively. Any increase in the rate of external conductivity, considering the present kinds and thickness of firebox, flue and tube materials as practically fixed, must be through an increase in the rate of flow of the heated gases, and this in turn means the expenditure of a greater amount of energy to pull these gases through the boiler.

However, questions as to the proper gas areas, rate of flow of gases, best sizes of flues and tubes for the maximum rate of heat transfer, and relating to like factors should be carefully analyzed in order that the highest absorptive efficiency may be obtained, not only with the high but also with the low gas temperatures. While there is no difficulty in now obtaining a boiler horsepower from each 1½ to 2 sq. ft. of total evaporating surface, whatever further improvement can be made in this direction will provide just that much more margin of boiler over cylinder horsepower requirements and produce a corresponding gain in efficiency.

Steam Generation

Efficient absorption of heat for the generation of steam in the modern locomotive boiler can be more readily provided for than can suitable feedwater, effective boiler-water circulation, efficient combustion or the maximum pounds of dry saturated steam per hour, which latter is a fundamental requirement.

In present locomotive operation the quality of the steam, *i. e.*, the percentage of vapor in a mixture of vapor and water, is one of the most important and least-referred-to factors in road and laboratory test reports, particularly as the average modern locomotive boiler is notorious for delivering saturated steam to the superheater or to the steam pipes with a high percentage of entrained moisture. This is due largely to the relatively small steam space in the boiler, the close proximity of the water level to the throttle valve and the backlash due to the firebox tube sheet, and also to the fact that the most rapid movement of the steam is next to the throttle valve so that any water coming near it is immediately entrained due to the high velocity.

Road tests recently conducted on modern Mikado types of locomotives showed an average quality of from 94.7 to 96.3 per cent for the saturated steam as delivered to the superheater, indicating from 5.3 to 4.7 per cent of moisture, which is valueless so far as its power for doing work is concerned but which greatly increases the work to be performed by the superheater by throwing upon it work which should properly be done in the boiler.

The delivery of dry saturated steam from the boiler is an item that has been given but little consideration in steam-locomotive practice, the principal idea having been to produce evaporating capacity and depend upon the superheater to perform auxiliary boiler functions. Many changes can and should be made to improve this condition.

Steam Pressure Increase

One of the greatest and simplest improvements to be made in the steam locomotive can be effected by an increase in the boiler pressure in combination with greater quantity and better quality of saturated-steam production, higher and more uniform superheat, and compounding.

While the loss in steam pressure between the boiler and the valve chests of saturated-steam locomotives is considerable, this loss is substantially increased in a superheated-steam locomotive. Tests have indicated that the loss in boiler pressure at the valve chests when working at low rates of speed and cut-off will be about 5 per cent, at medium rates about 10 per cent, and at high rates about 15 per cent.

During recent years stationary-boiler engineers have not only determined upon their efficiency but have inaugurated the use of relatively high steam pressures, and with the urgent necessity for keeping the cylinders as small in diameter and the reciprocating and revolving parts as light as practicable, there would appear to be no good reason for not now utilizing saturated steam of 350 lb. pressure, which, in combination with 300 deg. F. of superheat, should provide, in addition to the many other advantages, a much greater opportunity for economy in power generation.

Steam Superheating

The use of superheated steam has done more to increase sustained hauling power, reduce fuel and water consumption and increase thermal efficiency than any of the other means and methods that have been generally adopted on the steam locomotive since its introduction, either singly or in combination. Sustained hauling capacity is increased due to the longer cut-off possible at comparative speeds and fuel and water economy result from the elimination of cylinder condensation, the increase in efficiency being progressive and in proportion to the amount of superheat up to the point at which the exhaust steam begins to show superheat.

With the average superheat now used, from 175 to 250 deg. F., the drawbar pull at a speed of 20 miles per hour is increased about 15 per cent; and at 50 miles per hour about 40 per cent; and due to the combination of superheat, larger diameter of cylinders and reduced cylinder back pressure, resulting from the use of superheated steam, it is possible to increase train tonnage about 30 per cent at speeds of about 30 miles per hour.

In the best existing steam-locomotive practice the superheat generally increases with the cut-off up to 50 per cent cut off, beyond which there is usually a falling off in the superheat. Furthermore, with short cut-off a fair water rate, *i. e.*, about 19 lb. per i.hp., can be maintained; but if the cut-off at the same speed is increased to over 50 per cent the superheat must be increased to about 300 deg. F. in order to maintain the same water rate, or otherwise, for example,

at 67 per cent cut-off, the steam consumption will increase to 21 lb. or more per i.hp. This for the reason that as the amount of superheat is increased the range of temperature in the cylinder during the stroke of the piston is decreased, until with sufficient superheat the changes in temperature cease entirely.

While the increased superheat results in a greater number of B.t.u. being exhausted from the cylinder, any such loss of a marked degree is more than offset by the smaller amount of heat exhausted per stroke, due to the fewer B.t.u. admitted to the cylinder per stroke at a given cut-off.

The use of highly superheated steam results in a saving of about 35 per cent of the total water evaporation per unit of power and in from 10 to 45 per cent saving in fuel, when using steam, depending upon the power output.

Existing fire-tube superheaters produce the maximum superheat only when the locomotive is forced to its boiler capacity, whereas the maximum economy is more desirable when the locomotive is working under average conditions at economical cut-offs and when the superheater should give as nearly as possible a uniform degree of high superheat under all conditions of working, regardless of the boiler evaporation. For example, if the degree of superheat obtainable at speeds of 50 miles per hour with 50 per cent cut-off could be obtained at 25 per cent cut-off, a water rate of considerably less than 15 lb. could be obtained as compared with existing rates of about 19 lb. Therefore, as the present limitation in the hauling power of the modern superheated-steam locomotive is the capacity of the boiler to produce continuously sufficient dry saturated steam of high pressure and of the superheater to maintain a uniform high degree of superheat, the possibility of improving it by means of average higher boiler pressures and superheat temperatures and better utilization of fuel, steam and waste heat, in combination with radical changes in the design and arrangement of the boiler and superheater equipment and in the saturated- and superheater-steam connections, offers one of the greatest opportunities to increase efficiency and economy. This applies particularly to the larger locomotives, many of which consume more fuel and water and do less work than the small locomotives of the same general design and equipment.

The proposed changes, while applying especially to the production of greater efficiency at economical cut-offs for maximum power and speed, would also improve the maintenance and operation of superheaters, boilers, flues, front ends, valves, cylinders, and exhaust nozzles and provide for the better equalization of a lower draft through the flues and tubes, lower front-end temperatures, less throwing of smoke, sparks and cinders, and lower cylinder back pressure, all of which would reduce loss of power, fuel consumption and wear and tear on machinery.

Some of the particular troubles reflected in both maintenance and operation, due to the existing, generally used boiler and superheater equipment, may be stated as follows: *a* Air leaks around outside steam pipes where they pass through the front ends, resulting in steam failures, burning out of front ends, reduction in the size of exhaust nozzles for the purpose of making engines steam, and increased water and fuel consumption. *b* Joints between superheater units and the saturated and superheated chambers of the headers leaking, and the cutting out of the units at the neck, between the ball joint and the tube *c* Too little water and steam space over top of firebox and combustion-chamber sheets and flues, particularly on grades and curves, contributing to lower superheat temperature and cylinder efficiency, and to superheater-unit tubes distorting due to entrained water being carried over with the saturated steam from the boiler to the superheater, causing obstructions in and damage to superheater tubes and obstructions at the header. *d* Extreme losses in steam pressure between boiler and steam chests: *e* Boiler flues clogging, due to ash and cinders packing in around return bends and centering clamps and tubes.

While the superheater has generally been considered as a part of the boiler, particularly as regards its evaporation of entrained moisture in the saturated steam it has no relation whatsoever thereto insofar as its individual functioning is concerned, and the more that the saturated-steam-conducting and superheated-steam-delivering conduits, as well as the superheater equipment in itself, can be divorced from the boiler and front-end connections and their proper functions without introducing separately fired apparatus, the better will be the general results from the standpoint of efficiency, maintenance, operation and economy of the locomotive as a whole.

Some of the points to be considered in correcting existing deficiencies may be stated as follows:

Steam Temperatures. The steam temperature should be uniform for the variable speeds and capacities of operation. At the present time high temperatures obtain only at high speeds and capacities. A minimum temperature of 650 deg. F. quickly after starting, and of 700 deg. at maximum power and speed, would be much more effective and economical. For example, a locomotive equipped for generating 350 lb. steam pressure and 300 deg. superheat, representing a total temperature of about 736.4 deg. F., will, as compared with one using 200 lb. steam pressure and 300 deg. superheat—representing a total temperature of about 687.9 deg. F., require an increase of only 18 B.t.u., or 1.3 per cent in total heat in the steam, and an increase of only 48.5 deg., or 7.05 per cent in the temperature of the steam to produce an increase of 150 lb. or 75 per cent in the steam pressure.

Dome or Steam Outlet. This should be fitted with baffles for the purpose of reducing liability of priming and entrainment of water with saturated steam.

Saturated-Steam Delivery Pipe. This should be located outside of the boiler and be of adequate cross-sectional area to reduce steam-pressure losses.

Steam Trap or Separator. A steam trap or separator should be installed between the saturated-steam delivery pipe and the superheated saturated-steam chamber for the purpose of further eliminating moisture and condensation from the superheated units and also as a re-evaporation chamber.

Superheated Header or Saturated- and Superheated-Steam Chambers should be removed from the interior of the front end.

Superheated Units should consist of not more than two tubes per boiler flue and should be of such design and arrangement as will admit of location close to the top of the flue, in order to permit free passage for cinder and ash and cleaning of flues.

Unit Joints to Saturated- and Superheated-Steam Chambers. Unit joints should be removed from the direct path of gases and cinders so as to avoid cutting out, and should be supported in a positive, equalized and flexibly yielding manner to prevent leakage due to the loosening of one joint causing the loosening of another and so that the joint bolts can be tightened at the top of the header castings.

Superheated Dampers. These should be kept in good operating condition so that when the steam ceases to flow through the superheated units the products of combustion will stop flowing through the superheated flues, particularly when drifting at high speeds.

Steam Delivery Pipes from the Superheated-Steam Chamber should be made of adequate cross-sectional area to reduce steam-pressure losses and removed from the interior of the front end so that no joint where they pass through the front end will be necessary.

Automatic Saturated-Steam Supply When Drifting. This is essential to eliminate the human element and insure a

proper supply of saturated steam with the superheated steam just before the throttle closes and continuously thereafter. A jet of saturated steam should also be supplied to the exhaust nozzle to neutralize the gases ordinarily drawn through the same into the valve chests and cylinders.

Modern types of locomotives have developed at low speed 3,000 i.hp. and at high speed 3,200 i.hp., and comparative average water rates through the complete range of the effective capacity of the locomotive, with piston speeds of from 600 to 1,000 ft. per min., have been obtained as shown in Table 2. At piston speeds of less than 600 ft. per min. the water rate of the double-expansion saturated-steam locomotive will approximate that of the single-expansion superheated-steam locomotive.

TABLE 2—COMPARATIVE WATER RATES OF LOCOMOTIVES WHEN USING SATURATED AND SUPERHEATED STEAM

Cylinders	Steam	Water rate per i.hp.-hr., lb.
Single-expansion	Superheated	16 to 20
Single-expansion	Saturated	24 to 29
Double-expansion	Superheated	15 to 18
Double-expansion	Saturated	19 to 22

Compounding. With the exception of the Mallet articulated type of compounding, the multiple-expansion system of steam utilization, which has been so successful in marine and stationary practice, has not made the progress in this country that it has in Europe.

The failure of various types of cross, four-cylinder, four-cylinder balanced and tandem double-expansion locomotives, introduced from 25 to 15 years ago, to produce the predicted economy was due largely to factors of indifferent design, low boiler pressure, excessive condensation, lack of proper maintenance and operation, poor fuel and road failures. Clearance limitations also restricted the size and arrangement of the low-pressure cylinders, while at the same time the single-expansion-cylinder superheated-steam locomotives gave opportunity for greater hauling capacity and economy.

The three-cylinder compound has frequently been advocated owing to the allowable reduced cylinder diameters and piston thrusts and a more uniform turning movement, but its use has been deferred owing to central main-rod and axle complications.

There is no doubt but that a properly designed superheated cross-compound locomotive embodies many advantageous features such as greater starting and hauling capacity per unit of weight, less evaporating surface per indicated horsepower, reduced fuel and water consumption and less boiler repairs, and that it will return to favor for freight service in combination with higher boiler pressures and superheat, due to the necessity for greater drawbar pull and horsepower and for utilizing all superheat before its final exhaust.

The Walschaerts gear, as well as other outside valve gears now generally used, is accessibly located outside of the frames and driving wheels and driven from both the crosshead and an eccentric crank, but they all have the disadvantage of a constant lead and of being affected by the vertical displacement of the axle.

By eliminating the disadvantages of the outside valve gears now in use and adding certain improvements for the purpose of increasing the ratio of expansion and shortening the ratio of compression, the tractive effort can be increased at least 10 per cent at all points of cut-off and the fuel consumption reduced 5 per cent through ability to develop the same drawbar pull with a shorter cut-off. Such a change will add greatly to the efficiency of the steam locomotive.

Where compound cylinders are used a steam expansion regulator should be incorporated with the motion gear to effect the automatic independent adjustment of the cut-off for each of the high and low-pressure cylinders for the purpose of obtaining certain cylinder ratios, and at the same time bring the cut-off in harmony at the center of the quadrant. By this means the ratio between the high and low-pressure cylinders, which, for example, should properly be 1 to 3 at starting, can be brought to 1 to 4 at cut-off, thereby insuring easy exit of the exhaust steam from the low-pressure cylinder and at the same time automatically distributing the work properly between the two cylinders at speed. In this way a compound locomotive of the Mallet articulated type can be made to develop at least 55 per cent of its rated tractive power at a speed of from 8 to 10 miles per hour, when operating at 25 miles per hour, and there will be a gain in tractive power of about 15 per cent at 25, and of about 10 per cent at 30 miles per hour. In fact, a drop in the drawbar pull in a Mallet articulated compound locomotive on account of speed should not materially increase beyond that of a single-expansion engine.

Cylinder Clearance. The inauguration of the use of the inside-admission piston valve and of superheated steam has brought with it the wasteful effects of larger cylinder clearance, due principally to the use of a valve of too large diaameter and an indifferent design of valve chest and ports in combination with the cylinder castings. To somewhat overcome this trouble the piston valves were increased in length, with subsequent breakage of castings through the vertical ports, particularly as the result of water from condensation and unstayed flat surfaces.

The use of smaller-diameter piston valves located close to the cylinder and connected with properly designed expanding steam ports will, in combination with improved material and workmanship, correct these generally existing deficiencies.

Cylinder Back Pressure. About 75 per cent of the cylinder back pressure is due to the use of the exhaust steam to produce draft for combustion, evaporation and superheat. Assuming that for every 100 hp. in steam used only 60 per cent is utilized in producing actual tractive power, then 40 per cent is wasted through the exhaust, of which 75 per cent is chargeable to steam and superheat generation.

Much remains to be done in the way of enlarging exhaust-steam openings from the cylinder to the atmosphere and in reducing existing sharp turns, cramped passages and obstructions to the free passage of steam through them; and also in the development of an exhaust stand and nozzle that will combine the advantages of the single and double types. It has been found that by enlarging a 5½-in. diameter exhaust nozzle to 5¾ in., or about 9.3 per cent in area, fuel consumptions have decreased from 15 to 20 per cent, depending upon fuel and weather conditions, and that the locomotive efficiency has been increased from 10 to 15 per cent, depending upon cut-off and speed.

Valves and Cylinders. Inside-admission piston valves, although inherently deficient with respect to water and compression-relieving capacity, have many advantages, particularly for superheated steam, and the application of double-ported valves for low-pressure cylinders has worked out satisfactorily.

Various tests and many years' experience have demonstrated through the better use of steam and the resulting reduction of jerking, pulling and stresses on valve stem and gear, unbalanced pressure, frictional contact, valve and bushing wear, leakage and lubrication, the practical advantages of a minimum diameter and weight of valve with the circumference no greater than the length of a slide-valve port and with every inch of bushing port made effective and designed in conformity with the well-known principles governing the flow of gases so as to eliminate eddies and baffling in the steam flow between valve and cylinder.

In addition to reducing the weight of a valve by reducing its diameter, it can be further lightened by using a smaller spool, as experience has proven that with simple cylinders an area of opening through the valve body equal to one-half

the area of a single exhaust-nozzle orifice is sufficient to obviate the hammering of the exhaust steam on the valve ends. With cross-compound cylinders the conditions are even more favorable, due to the receiver pressure. Furthermore, there is still a possibility of considerably reducing weight in bull-ring and follower designs, which will further reduce the stresses in valve rods and gears that have been found to increase with the speed, cut-off and weight of valve.

There is also considerable opportunity to improve packing rings by locking and putting them in absolute steam balance, preventing exhaust rings from collapsing under compression or being forced from grooves into ports between bridges, and stopping leakage of live steam to the exhaust side of the valve. Extended rods and carriers for the front ends of both valves and pistons have also been found essential to the best results. Two refined-gray-iron packing rings should be sufficient for all pistons, and two-piece one-ring piston and valve-rod packing of a suitable aluminum alloy should be satisfactory. Wherever possible the center line of each cylinder, under normal working condition, should be in horizontal alinement with the centers of the driving axles. All cylinders should be equipped with suitable bypass valves.

Piston Speeds. Frequent errors have been made in not properly proportioning the driver-wheel diameter and stroke of the piston. Slow speed and high ratios of expansion are factors particularly favorable to superheated steam, and piston speeds of from 700 to 1,000 ft. per min. will insure the best results.

General. With superheated steam too much attention cannot be given to the foregoing and other details in valve and cylinder design and material, as the waste of steam, heat and power at these points has much to do with keeping down the thermal efficiency of the locomotive as a whole.

Waste-Heat Distribution and Utilization

As a reasonable estimate would show that 40 per cent of the heat in the steam and in the products of combustion is exhausted from the stack, any considerable part of this heat that can be reclaimed for preheating boiler feedwater will add greatly to the overall efficiency of the locomotive and to the saving in fuel. The principal means through which to accomplish this saving, in a practical way, are exhaust-steam heaters and flue-gas economizers, both of which can be readily adapted to a modern steam locomotive.

Exhaust-Steam Heaters. With the many steam-using auxiliaries, such as those for air compressing, boiler feeding, valve-gear operating and electric lighting, which operate when the locomotive is standing, drifting or working, a combination open and closed type of feedwater heater and purifier for the utilization of the exhaust steam from these auxiliaries, supplemented if necessary by steam from the main engine's exhaust, should receive prompt consideration.

From actual service tests of closed types of heaters, made on modern superheated-steam locomotives, using a portion of the main-engine exhaust steam only, it has been found that a feedwater temperature approximating 240 deg. F., or within 15 deg. of the exhaust-steam temperature, can be obtained without interfering with the draft required for maximum steam and superheat generation.

Flue-Gas Economizers. Owing to the high rate of combustion and evaporation and in the process of superheating much heat is usually wasted, as the gases from which the steam receives its heat must be hotter than the steam itself. The higher the steam pressure the less is the average difference in temperature between the gases of combustion and the contents of the boiler, therefore the slower the transmission of heat the greater the work of the economizer may be. Likewise the lower the efficiency of the boiler will be if it is not supplemented by an economizer.

An economizer will heat the feedwater to a higher temperature than an exhaust-steam heater and will recover most of the waste heat resulting from high steam pressure and high superheat, as it is able to recover low-temperature heat that has escaped from the boiler evaporating or superheater surfaces because the average temperature of the feedwater within the economizer, which should, if practicable, be brought up to the boiler evaporating temperature, is much lower than the temperature of the water in the boiler.

As locomotive smokebox superheaters, now obsolete, have demonstrated that 50 deg. of superheat may be obtained from flue gases at 600 deg. F., there should be no difficulty in devising a locomotive economizer that will produce very effective results, in combination with high boiler pressures, superheat and draft, without baffling the boiler draft and evaporating capacity. In fact, with an average boiler efficiency of 60 per cent and an economizer efficiency of 50 per cent the possibility of recovering from 25 to 50 per cent of the stack gas losses and increasing the thermal efficiency of the entire unit, is within the limits of possibility.

General. Another factor favoring the use of combination exhaust-steam heaters and flue-gas economizers is the opportunity to reduce the noise and nuisance now created by the steam exhausting from the main and auxiliary engines through the muffling of the exhausts.

Discussion

F. J. Cole (American Locomotive Company) took issue with many of Mr. Muhlfeld's statements. He cited the fact that a modern locomotive will produce a horsepower hour on less than two pounds of coal to prove that the locomotive is an economical power plant. He stated that the usual design of locomotive boiler is not suited for a pressure of 350 lb. and that it must be radically changed to carry such high pressure. Mr. Cole pointed out that by the use of trailing wheels the boiler design is improved and higher efficiency secured. He thought it doubtful whether increased water volume would add to the efficiency of the boiler. Mr. Cole also stated that while the high cost of coal undoubtedly justified the introduction of devices that increase capacity and economy, the increased maintenance cost resulting from their use must be considered.

Clement F. Street (Locomotive Stoker Company) questioned the data Mr. Muhlfeld submitted regarding the cost of electric operation. He defended the performance of locomotive stokers, and stated that while the fuel performance secured on stoker-fired engines did not equal the results obtained by the best firemen, the stoker would save coal as compared with the average fireman.

H. B. Oatley (Loccmotive Superheater Company) stated that the program of improvement laid out by Mr. Muhlfeld was not entirely practical as regards economy, though almost ideal from the standpoint of the generation and utilization of steam. He stated that with the proper design of boiler a steam pressure of 500 lb. would prove both safe and economical, and stated that condensing operation was not beyond the realm of possibility.

E. B. Katte (New York Central) disagreed with Mr. Muhlfeld's conclusions regarding the objections to electrification. He stated that experience had proved that the capital cost was not prohibitive, that electrical operation had been demonstrated efficient, economical and reliable for every class of service. He pointed out that electrification increased the capacity of tracks approximately 30 per cent and that while the first cost of the installation was higher than for a steam operated road the operating expense was less.

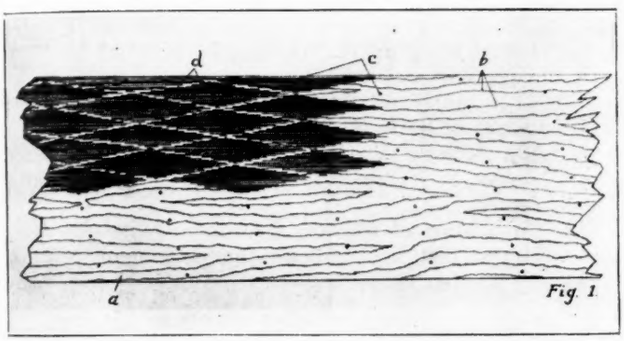
In closing the paper Mr. Muhlfeld stated that the cylinder temperature is the limiting factor in the boiler pressure carried. Superheated steam locomotives have been operated with steam temperatures as high as 750 deg., and this he considered the practical limit at the present time.

Timber Perforating Patent Released

Improved Method of Preparing Douglas Fir for Treatment is Dedicated to the Public

ONE OF THE RECENT DEVELOPMENTS in the timber preservation field is the dedication to the public of a process for perforating cross-ties and timbers to facilitate and better their preservation. The rights to this process were retained until October 6, 1919, by O. P. M. Goss under his letters patent No. 1252428, issued on January 8, 1918, when they were acquired by the Association of Creosoting Companies of the Pacific Coast and, by them, together with Mr. Goss, were released for general use; the dedicating document being filed with the U. S. Patent Office at Washington, D. C.

This process, which was developed to relieve the difficulties and uncertainties found in the treating of Douglas fir crossties and timbers, was described in considerable detail in an



Plan-view Showing Location of Holes and Spread of the Preservative

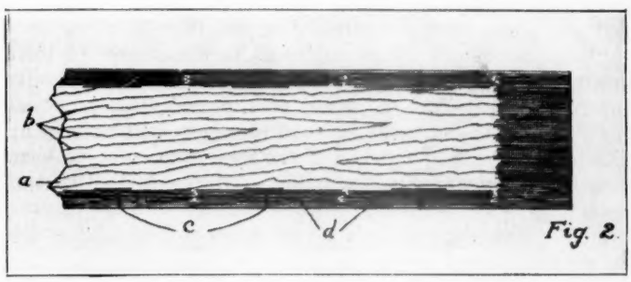
article by O. P. M. Goss on page 783 of the April 13, 1917 issue of the *Railway Age*. The results obtained in the treatment of this wood were seldom satisfactory, due chiefly to its high refractory character and its non-uniform resistance to the penetration of preservatives. This characteristic was more marked in the treatment of sawn Douglas fir where preservatives had to be injected into the heartwood, and it was not uncommon to find a decided difference in the depth of penetration and spread of the preservative in the same piece of timber.

The improvement in the method of treatment consisted primarily of a method of perforating the surface of the wood to be treated by holes systematically located at uniform distances apart, both transversely and longitudinally. These distances depended on the known normal absorption of the preservative with and across the grain of the wood under a given time of immersion, pressure and size of perforations. The result of the treatment gives a substantially uniform penetration of the preservative to a depth equal to that of the holes and without waste.

In Figs. 1 and 2, there is represented a block of timber whose treatment has been partially completed, the letters a, b, c and d representing respectively the timber, the grain, the perforations and the areas over which the preservative spreads from each hole. In the illustrations, the areas adjacent to each hole have not yet come together, as will be the case when the preservative has been fully absorbed by the timber, for, as will be noted, the extent of the absorption of the preservative is much greater along the grain of the wood and, as this extent of absorption can be determined by experiment, the perforations can be so located that the minimum areas impregnated will overlap at their margins. Through the staggering of the holes, the uniform and even treatment of the timber was promoted without the danger of the holes being so close together as to appreciably reduce the transverse strength of the timber.

In preparing Douglas fir for the open tank method of treatment, the timber was perforated with small holes 1/16 in. in diameter spaced 4 in. apart along the grain and ⅛ in. across the grain. The pieces to be treated were then boiled in a preservative oil for four hours at a temperature of 215 deg. F., after which the material was allowed to cool in the oil, the total time of the treatment being approximately 12 hours. A complete and practically uniform penetration was obtained in this way, while a similar result was obtained by the pressure retort method by previously perforating the wood to a depth of ¾ in. and ⅛ in. wide across the grain, the holes being spaced 7 in. with and ⅜ in. across the grain. The pieces were then placed in a pressure retort, the preservative oil introduced and raised to a temperature of 170 deg. F. The material was subjected to this temperature for four hours, after which a pressure of 120 lb. per sq. in. was applied, one hour being required to bring it to this pressure, which was held for a period of two hours, the temperature remaining the same.

While this process was developed in the study of the treatment of Douglas fir, it is applicable as well to other timbers, such as Southern pine and oak. Its application to bridge and structural timbers may require some modifications in the cross-sections designed to carry standard loading, but it is not expected that the perforating will materially reduce the strength of the timber, as it is done along the fibres of the wood and not across them. The machinery which has been built and used up to the present time for this purpose is applicable only to dimension stock such as cross-ties, switchties, bridge timbers and structural timbers. Studies are being



Split-section of Tie Showing Perforations and Corresponding Depth of Absorption

made, however, of the design of a machine that is expected to perforate poles and piling with equal satisfaction. One of the main advantages claimed for this method of preparation for treatment is that in addition to controlling or preventing the "checking" of material as commonly found, especially in sawn Douglas fir, and the giving of an even penetration of the preservative, it will also accomplish the important commercial result of reducing the period of treatment required to inject a given amount of preservative into the timber.

A short time after the patent was granted, its control was vested in Mr. Goss and the Charles R. McCormick & Co.,

San Francisco, Cal.; the St. Helens Creosoting Company, St. Helens, Oregon; the J. M. Colman Company, Seattle, Wash.; the Pacific Creosoting Company, Seattle, Wash.; the St. Paul & Tacoma Lumber Co., Tacoma, Wash., and the Columbia Creosoting Company, Portland, Oregon, composing the Association of Creosoting Companies of the Pacific Coast. No development progress was made during the European war, but an attempt was made by the owners early in 1919 to introduce the use of perforating before treatment. Royalty charges of one-half cent per cross-tie and 15 cents per 1,000 bd. ft. for lumber were adopted and announced to the railroad and commercial treating plants of the United States, where they met with considerable opposition. Believing that the best interests of the Douglas fir industry in the Pacific northwest would be furthered by the elimination of royalty charges, Edmund M. Blake of the Charles R. McCormick & Co. took the initiative in an effort to bring about this result. This was successfully accomplished on October 6, 1919, with the full co-operation of the above mentioned creosoting companies.

Railroad National Advertising

THOMAS DEWITT CUYLER, chairman of the Association of Railway Executives, has announced that the fundamental facts of the railroad situation would be presented to the country by means of national advertising. The opening statement, to appear in the daily newspapers during the next few days, is signed by nearly a hundred executives of the principal railroads. It will be followed by a series of advertisements in the daily and weekly newspapers and in other publications.

"The unmistakable verdict of public opinion," said Mr. Cuyler in making the announcement of the plan of the railroad companies, "is that this great national industry shall continue to be conducted by private companies under strict public regulation. Modern railroad companies, of course, are not private affairs. Their capital is subscribed by a vast number of individual investors as well as by institutions, such as savings banks and life insurance companies, holding the savings of millions of people, and they are subject to the most minute regulation by the public authorities. In Europe such corporations are called public companies, and this name more accurately describes them.

"With the return of the railroads to the control of their owning companies, after two years of war service under government operation—a period of unprecedented industrial and financial change—the railroad managers will have many difficult problems to face. But the most important problem—the one most affecting the public welfare—will be that of attracting to the railroad business a flow of new capital, without which the railroads cannot grow and without which the country cannot grow.

"The whole railroad problem sifts down to this fundamental fact that in a growing country like ours, with the transportation demands increasing much faster than the population, there must be a continuous investment of new funds in the expansion of railroad facilities.

"Railroad freight traffic reached 200,000,000,000 ton-miles in 1906; it rose to 300,000,000,000 in 1913, and last year it crossed the 400,000,000,000 mark. The railroads are now hauling five times as much traffic as they did 30 years ago. And traffic is going to keep right on growing, because this country is going to keep right on growing."

"To keep pace with this increase in business the railroads before the war were expending about $500,000,000 a year of new capital for expansion. That, as we all know, was not enough. But railroad earnings were not large enough to attract the funds of investors in greater amount. In fact, for several years the market for new railroad stock had vanished. Nearly all the new capital had to be obtained through the sale of mortgage bonds and short-term notes. The companies were obliged to increase the number of their creditors because they could not attract more shareholders.

"During the period of war control the government has been unable to keep up normal expenditures for railroad upbuilding. Last year the labor and materials had to be devoted to the prosecution of the war, and this year the government has not had the money to spend. So with the return of the roads to their owners the managements will be faced with the necessity of very large capital expenditures for betterments and improvements. And this work will have to be done at a cost for labor and materials about double what it was before the war. New capital expenditures at the rate of $1,000,000,000 a year would, therefore, seem to be the minimum required if the railroads are to be enabled to handle the growing traffic of the country.

"To attract the new capital for upbuilding the railroads, the transportation industry must be able to earn a fair return on this capital. Adequate earnings are only possible with adequate rates for service. The rates now are admittedly too low to meet the greatly increased expenses of operation and leave a fair margin for capital."

In the opening statement to the public, signed by the executives of nearly all the principal railroad companies, the Association of Railway Executives states:

"It is the declared purpose of the United States government to restore the railroads at an early date to the control of their owners.

"The Association of Railway Executives represents those upon whom at that time responsibility will again rest for the prompt and successful movement of the country's commerce.

"Those constituting this association are keenly conscious of their accountability to the public.

"They have accordingly determined to present, as fully as they can, the fundamental facts and considerations which they themselves must face in their efforts to provide satisfactory railroad service.

"It is hoped to engage the interest of the whole American people, whose welfare is so vitally dependent upon adequate transportation.

"The country can grow only as the railroads grow. The railroad problem must be solved—and solved rightly and soon—if our country is to prosper.

"It is to promote that prosperity—permanently and in the interest of the whole people—that railroad executives will present to the public the situation as they see it."

A Queue on the Thames Embankment Waiting for Tram Cars

Hearing Before the House Commerce Committee*

Commissioner Clark Favors Compulsory Arbitration; Mr. Gompers Clashes With Representative Webster

EDGAR E. CLARK, member of the Interstate Commerce Commission, appeared before the House Committee on Interstate Commerce on Thursday and Friday of last week, devoting most of his time to comments on points that have been developed in the discussion before the House committee and the Senate committee. He denied that regulation of railroad rates had operated to reduced revenues. In this connection he said: "Much has been said about restoring railroad credit. I confess I do not yet definitely understand just what is meant by that phrase. Certainly it cannot be proposed that Congress shall by legislative fiat provide all railroads with a standard and uniform basis of credit." In his opinion, some railroads had good credit and some had poor credit, the former being the result of good management or favorable conditions and the latter of poor management, financial juggling or unfavorable conditions. He said that the trend of railroad earnings in recent years under regulation had been upward. It was not true, he said, that the commission had neglected to take into consideration the credit of all the roads. He cited numerous benevolent expressions of the commission in rate cases (notably those in which the application of the roads for higher rates were denied). On the other hand, he said, he doubted very much whether railroad credit had been helped by statements of railroad representatives.

He discussed the short line situation and said that he believed it would be unwise to give the Interstate Commerce Commission or any other agency the power to route unrouted shipments of freight. He was asked: "How can the weak roads be helped?" and replied: "When the legislature has provided a good law giving the weak railroads a fair opportunity and protection against unfair discrimination by stronger competitors, the law has done all that it can do.

"I personally would be against a guarantee unless based squarely on the value of property.

"I object to taking the profits from strong roads and giving them to weaker roads."

He thought that the only thing that can be done with the weak roads was to put them through a reorganization and he thought that the poor roads could be left out of a government guarantee. The case of the guarantee of bank deposits in Oklahoma was cited, but Representative Rayburn pointed out that the analogy between deposits is not good, whereas the guarantee that depositors would not lose the money they had put in a certain bank because the resources and credit of all the banks would be used to make good the assets of one bank, was not the same as providing that a sinking fund of, say, 1 per cent should be established by all the roads and that this fund should be used to meet a deficit of earnings of certain roads.

Returning to the case of the short lines, Commissioner Clark said that he believed that these lines should and could be aided by their trunk line connections as long as this aid did not constitute a rebate in favor of an industry which controlled or owned the majority stock of a short line.

Commenting on the testimony of witnesses who had discussed the taking of the water lines away from the jurisdiction of the Interstate Commerce Commission, he said that, in his opinion, no benefit had accrued to the public by any divorcement of water lines from railroad lines by the Panama Canal act.

He was then asked about the labor provisions of the Cummins bill and expressed the opinion that while no legislative enactment could compel a man to work when he wanted to quit work, nevertheless some legislative provision could be made which would prevent, apparently through compulsory arbitration, a tying up of the railroads of the country.

Mr. Clark was asked whether he thought there ought to be another governmental agency to consider the general railroad problem of the entire country, condition of railroad credit, etc., and to act in an advisory capacity to the Interstate Commerce Commission for the purpose of aiding the commission in fixing rates. He answered that he did not think this would be a good thing, because he thought that if the commission were to be influenced by the information collected, the commission itself ought to collect the information. He thought that there would be a disagreement between the board and the commission after a time. Mr. Clark said that rate-making would be simplified if Congress were to lay down in the act as a rule of law for the administrative tribunal the standard by which it is to measure the determination of reasonable and just rates and that he thought it would be better for Congress to do this directly than through some other governmental agency.

A. P. Thom, general counsel for the Association of Railway Executives, said that he wanted to get the most authoritative expression of opinion that it was possible to get on the provisions of the Cummins bill, which would take away all of the profits of a successful road above a certain fixed percentage. He, therefore, asked Charles E. Hughes, former justice of the Supreme Court of the United States, to render an opinion in the form of a letter to Mr. Thom. He introduced this letter into the testimony.

Justice Hughes' Letter

This opinion refers to section 6 of the Cummins bill, which proposes to take from the railway companies all earnings in excess of what from time to time the Interstate Commerce Commission holds to be a "fair return" on the value of their property. This is the same provision against which T. DeWitt Cuyler, chairman of the Association of Railway Executives, protested in his letter to the Senate Interstate Commerce Committee on September 9, holding that it would practically destroy the incentive to efficient and economical railroad management, and that it would make it impossible to raise the amounts of private capital needed for railway expansion in the future.

Judge Hughes' opinion in brief is that if rates which produce so-called excess earnings are just and reasonable rates, as they are presumed to be when fixed and regulated by a public authority like the Interstate Commerce Commission, then the earnings from those rates are the property of the railroad companies. They may be taxed but they cannot be taken away. That would be confiscation.

Judge Hughes says:

"Section 6 of the bill provides that: 'Rates of transportation shall at all times be just and reasonable.' It is provided in Section 1 of the bill that rates, fares and charges in force at the time of the repeal of the federal control act

* Because of the delayed issues of the *Railway Age* and the necessity of giving our readers as early advice as possible concerning the Esch bill and its passage by the House, the story of the latter part of the hearings before the House Committee on Interstate Commerce was held back. Some of our readers, however, insist that it be placed on record to complete the story which we have already published, and so that it will be available for reference in following the course of the bill through conference and to the final passage of a railroad bill.—EDITOR.

of March 21, 1918, shall remain in force until changed by competent authority. It is further provided in Section 5 of the bill that schedules of rates, fares and charges filed with the commission in accordance with the 'Act to Regulate Commerce' within 30 days after federal control ceases shall become effective at the end of four months after they are so filed, with such modifications as may be ordered by the commission, and the commission is required within that time to determine whether they shall be modified 'in order to make them fair, just and reasonable rates for the service to be performed.' It is further provided in Section 44 of the pending bill, amending Section 15 of the 'Act to Regulate Commerce,' that whenever the commission after a hearing either on complaint or on its own initiative shall be of opinion that any individual or joint rate, fare or charge whatsoever charged or collected by any carrier is or will be unjust or unreasonable the commission is authorized to determine what will be the just and reasonable individual or joint rate, fare or charge to be thereafter observed, and the carrier is prohibited from making any charge which is in conflict with this determination. Thus all the rates fixed and maintained are at all times open to inquiry and the commission has full authority to insist that the rates shall never be more than just and reasonable compensation for the services which the carrier renders. Nor does the bill interefere with the reparation proceedings which may be entertained on the application of persons aggrieved by extortionate charges.

"Taking all the provisions of the bill into consideration, it would seem that the rates as fixed and permitted to be charged and collected by the carrier, assuming that the rates are not confiscatory, should be regarded as just and reasonable rates fixed and maintained by competent authority. It is also to be observed that Section 6 of the bill providing for the payment to the Railway Transportation Board of the so-called 'excess' earnings does not provide for a determination that the rates under which the described 'excess' has been collected by the carriers were not just and reasonable rates for the services rendered.

"If, however, the rates thus fixed, charged and received by a carrier are to be deemed just and reasonable for the services rendered, the carrier is entitled to these receipts as its property, and the taking by the government of any portion of these receipts (except under a valid tax) for general governmental purposes or for the benefit of other carriers would appear to be taking of property contrary to the fifth amendment of the federal constitution.

"The provision of the pending bill is not a tax laid upon all carriers with respect either to gross receipts, or net receipts, or any other basis for the assessment of a tax, but is simply a requirement of the payment to the government board of the 'excess' earnings of a carrier which the Interstate Commerce Commission determines to be more than a 'fair return' upon the value of its property. Such an exaction goes beyond the limits of any decision known to me, and if the rates under which the so-called 'excess' earnings are collected by the carrier are to be deemed to be just and reasonable rates, fixed and maintained as such under the authority of law, I am unable to escape the conclusion that the requirement as to the payment of the so-called 'excess' earnings of a carrier exceeds the constitutional authority of Congress as applied to carriers not transacting their business under a federal franchise or contract imposing such a condition."

To the argument that the fixing of rates by a regulating authority may be considered only tentative, and that the rates so fixed may be assumed to be unreasonable if they produce excess earnings, Judge Hughes holds that what is a reasonable rate cannot be determined in this way, which is not a regulation of either rates or service, but of earnings. Congress and the Interstate Commerce Commission have no power to permit the collection of rates which are extortionate, even for a temporary period; and, therefore, what is a reasonable rate for a given service at a given time must be ascertained at the time the rate is made.

Judge Hughes' argument on this point is as follows:

"It is difficult to understand upon what theory of proper regulation such rates are to be deemed to be unreasonable without any further inquiry as to the conditions of the service or as to matters directly relating to the rates themselves, but solely upon an inquiry with respect to the value of the carrier's property and the amount of the total net earnings derived by the carrier from its operations. The latter may be a legitimate inquiry for a court in determining whether a legislative body or its subordinate agency has transcended its authority in fixing a body of rates so low as to be confiscatory. But it is a different thing thus to conclude that rates which are not confiscatory, and which as individual or joint rates have been expressly found in the case of the particular carrier to be just and reasonable for the services rendered were in fact not reasonable rates.

"Moreover, whether the rates which have produced the so-called 'excess' earnings of the carrier have or have not been sustained in proceedings under Section 15 of the 'Act to Regulate Commerce,' as amended, with respect to the individual and joint rates of the particular carrier, the fact remains that the rates charged and collected have been fixed and maintained as just and reasonable rates, and that the bill does not require as a necessary preliminary to the required payment of the 'excess' that there should be a finding that the rates were in fact unreasonable rates. The only finding required is that a particular carrier has earned more than the amount which the commission determines to be a 'fair return' upon the value of its property held or used for the service.

"The argument in support of the provision seems to assume that Congress, under the guise of regulating rates, either directly or through the commission, can abandon the fixing of what are reasonable rates for the services rendered by the carrier, and without any determination that the particular rates or the tariff schedule of a carrier are unreasonable, take the earnings of a carrier simply upon a determination that the carrier has received an 'excess' over a 'fair return' upon the value of its property.

"This would appear to be not a regulation of rates, or of service, but of earnings. I do not understand that it is within the authority conferred upon Congress to regulate interstate commerce to determine how much a carrier not exercising a federal franchise, or operating under a federal contract, shall earn in interstate commerce, assuming that the carrier discharges all the public obligations incident to its sevice and charges reasonable rates. In my view the regulation of such a carrier must have direct relation to the service it renders and if the question is of the amount of money it should receive for its service, to the reasonableness of its charges.

"Again, if the assumption could be indulged that the carrier has received more than a 'fair return', is to be regarded as tantamount to a finding that the rates which produce the 'excess' earnings are unreasonable rates, and that such a finding with an inquiry with respect to the rates themselves, but only as to earnings, could be sustained, there would be a further difficulty.

"If it is established that the rate is a reasonable one for a shipper or passenger to pay, it is the carrier that renders the service for which the rate is to be paid and it is proper that the carrier lawfully performing the service, and furnishing all the required facilities therefor, should receive and enjoy the proceeds of the rate thus charged. An attempt to

divest the carrier of any portion of its earnings thus obtained, on the theory that the charges which it was reasonable for shippers and passengers to pay for its services it was unreasonable for the carrier to receive and retain would, in my judgment, be outside of the scope of appropriate and valid regulation. The mere fact that it is proposed to devote the moneys or property of a carrier or of any other person to good uses cannot be regarded as justifying the deprivation of the carrier or such person of the right to enjoy and retain his own property, except as it may be taken for proper governmental purposes through valid taxation, or for public use on the payment of just compensation.

"For the reasons stated, I am constrained to the conclusion that the provision in section 6 of the pending bill as to the payment of 'excess' earnings, in its application to carriers not operating under a federal franchise or contract permitting the imposition of such a condition, violates the federal constitution."

Mr. Warfield Replies to Mr. Hughes

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, has filed with both the Senate and House committees on interstate commerce an opinion by Elihu Root, John G. Milburn, John S. Miller, Hugh L. Bond, Jr., and Forney Johnston, advisory counsel of the association, that Congress has the constitutional power to regulate excess earnings of railroads over and above a fair return upon the value of their property. The opinion takes decided issue with that recently furnished by Charles E. Hughes and states that such excess earnings are the result of rates made to meet the actual necessities essential to the preservation of the life of the transportation system of the country.

"Without this power Congress must acknowledge is inability to sustain competitive agencies of transportation and the power to regulate commerce on a constructive basis would fail at the first test," the opinion states; "we have heretofore pointed out the desirability that any act of Congress proposing to regulate excess earnings thus produced should clearly set forth in the act the theory upon which the regulation is based and should make it clear that, to the extent to which rates established with this end in view shall be found to produce more than a fair and reasonable return upon the property of particular carriers, they are to be received conditionally and in trust for administration by the United States for the benefit of the general public interest in transportation.

"Most of the criticism directed against the process is based upon the assumption that the published rates kept in force from time to time by public authority are necessarily final and unconditional as to the carrier as well as to the shipper; and that legislation dealing with any portion of the proceeds of such published rates constitutes a mere effort to recover revenue which has become the absolute property of the carrier.

"We have heretofore advised that the legislation now under consideration by Congress should prescribe that while rates are to be just and reasonable so far as the shipper is concerned, the result is not to be regarded as attained unless they are also sufficient to sustain the agencies of transportation as a whole in the several rate-making groups; and, further, that the act should clearly state that although individual rates paid a given carrier in the group in order to sustain these agencies as a whole may include an element of excessive return for the specific service as rendered by that particular carrier, this excess is necessary to be paid by the shipper to sustain transportation in the group and will be dealt with by Congress in the interest of transportation as a whole rather than be left subject to recovery in a proceeding for reparation by the shipper. Recovery by the shipper would obviously amount to a rebate which would defeat the purpose. The question of 'reasonableness' from the shipper's standpoint is to be determined by the necessities of transportation in the group. He cannot insist upon a rate that would destroy essential agencies of transportation by attracting all of the business to their competitors. From the carrier's standpoint the question as to what each particular carrier shall be entitled to retain out of its earnings over and above a reasonable return upon its property is dependent upon entirely different considerations. The carrier cannot complain of action by Congress appropriately exerted under the commerce clause if such action leaves it with a fair and reasonable return.

"Singular confusion has arisen out of the reluctance in certain quarters to recognize the fact that a rate may be reasonable for a shipper to pay, because of the necessity of sustaining competitive agencies for transportation, which would be wholly unreasonable for individual carriers to demand if their case alone were being considered.

"This necessity would produce returns for certain carriers in each competitive group so excessive as to stand as a stumbling block to rates adequate to sustain transportation as a whole unless the excess is regulated. Denial of the right of Congress to deal with the excesses thus produced is tantamount to a denial of the power of Congress to regulate and conserve commerce. This excess is obviously a by-product resulting from the exertion by Congress of its regulatory power. We entertain no doubt whatever of the power of Congress, under appropriate legislation so stated as to demonstrate with accuracy just what is being done, to administer this by-product in the general public interest in transportation. No shipper can complain; and as it is a gratuitous excess temporarily conceded by Congress over and above a resonable return, it is difficult to ascertain any sound basis for complaint by the carrier." * * *

Testimony of A. P. Thom

Mr. Thom took up the question of the relation of state rates to interstate rates. He pointed out that the operating ratio prior to the government taking over the roads (in 1917) was 76 and that now the best that the roads could do was to retain 5 cents out of every dollar, the rest being required to pay operating expenses and taxes. He said that this situation was recognized specifically in the Cummins bill in Section 5, which provided for procedure during a period of reconstruction, but that in this provision nothing was said about state rates. Therefore, with the termination of federal control state rates would automatically go back to what they were in 1917, although interstate rates would be continued on present levels during the reconstruction period. This, Mr. Thom said, would create an impossible situation State rates must be readjusted; otherwise interstate rates could not be collected in practice even if they could remain on paper as they now are. He cited the case of coal moving from Pennsylvania coal fields to New York, Philadelphia and Baltimore. It would be impossible to charge a much higher interstate rate on coal to New York and to Baltimore and to charge the much lower intrastate rate on the same quality of coal to Philadelphia. The same would be true of wheat moving on an interstate rate from farms west of the Red river and intrastate rates on grain moved from farms just east of the Red river. He introduced the accompanying tables showing that state rates on distances from 35 miles to 400 miles were only about half what the interstate rate was.

He said that under the Esch bill some recognition of this situation was shown, but that under the Esch bill interstate rates would be regulated comprehensively, while state rates

would be regulated, if at all, only reluctantly. He was asked whether a state could not charter a road to do only intrastate business, and said that he thought legally it could but that practically it never would.

He thought that it was absolutely essential that one federal body should be given jurisdiction over the rates on every interstate carrier whether the carrier itself was wholly within one state or not and whether the haul was wholly within one state or not. He said, however, that if at this time Congress did not wish to go so far as to make a specific declaration of this scope there should be an amendment made to the Esch bill to provide:

1. That the carrier should have the right to complain to the Interstate Commerce Commission against a state rate.

2. That not only discrimination but inequality and undue burden on other rates could be complained of in regard to a state rate and,

COMPARISON OF COMMODITY RATES

(a) Director General's present Interstate rates in Minnesota and North Dakota.
(b) Minnesota Commissioners' rates.
(c) North Dakota Legislative rates (Act of February 19, 1919).

	Grain				Cement			Lumber		
	All grain. From stations on main line of Nor. Pac. Ry. to Minneapolis and Duluth		Coarse grain		From Duluth, Minn., to main line stations on the Nor. Pac. Ry.			From Minneapolis and Frazee, Minn., to main line stations on the Nor. Pac. Ry.		
Miles	(A)	Wheat (B)	(B)	All grain (C)	(A)	(B)	(C)	(A)	(B)	(C)
100	..	....	....	....	....	....	....	14.5	6.6	6.6
200	..	....	....	....	..	....	....	20.5	8.8	8.8
300	17	10.9	10.1	9.6	19	11.6	10.5	21.5	10.5	10.5
400	20	12	11.1	10.6	25	13.8	12.1	28.5	12.1	12.1

Live Stock

(Rates in dollars and cents for 36 ft. 6 in. car)

	Hogs in single deck cars			Cattle, carloads, also goats and sheep in double deck cars			Sheep or goats in single deck cars			Coal			
										From Duluth, Minn., to main line stations on Nor. Pac. Ry. in North Dakota (A)		(B) and (C)	
Miles	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	Hard	Soft	Hard	Soft
100	35.70	21.76	21.59	41.80	26.40	25.30	32.30	16.20	15.24	....	....	....	....
200	46.75	29.75	28.05	52.80	35.86	33.00	40.80	22.08	19.80	....	....	....	....
300	56.95	33.66	32.30	61.60	40.70	37.40	47.60	24.96	22.80	3.20	3.10	2.07	1.69
400	66.30	38.57	35.70	70.40	45.54	41.80	54.40	27.96	25.20	3.50	3.30	2.31	1.87

Note.—Rates for shorter distances not shown for the reason that there are comparatively few interstate movements for lesser distances.

COMPARISON OF CLASS RATES

(a) Director General's present Interstate rates in Minnesota and North Dakota.
(b) Minnesota Commissioners' rates.
(c) North Dakota Legislative rates (Act of February 19, 1919).

	1st Class		2nd Class		3rd Class		4th Class		5th Class		Class A		Class B		Class C		Class D		Class E	
Miles	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)	(a)	(b & c)
25	25	15.9	21	13.3	17.5	10.6	15	8	11	6.4	12.5	7.2	9	5.6	7.5	4.8	6.5	4	5	3.2
50	37.5	20.8	32.5	17.3	25	13.9	19	10.4	15	8.3	15	9.4	14	7.3	11.5	6.2	9	5.2	7.5	4.2
75	45	25.7	39	21.4	30	17.1	22.5	12.9	17.5	10.3	17.5	11.6	16.5	9	14	7.7	11.5	6.4	9	5.1
100	51.5	30.6	44	25.5	34	20.4	26.5	15.3	20	12.2	20	13.8	17.5	10.7	15	9.2	12.5	7.7	10	6.1
200	75	50.2	64	41.8	50	33.5	37.5	25.1	30	20.1	30	22.6	26.5	17.6	22.5	15.1	17.5	12.6	15	10
300	99	60	84	50	65	40	50	30	40	24	40	27	35	21	30	18	24	15	20	12
400	122.5	69.8	105	58.2	82.5	46.5	62.5	34.9	49	27.9	49	31.3	42.5	24.4	37.5	20.9	30	17.5	25	14

3. To confer power on the Interstate Commerce Commission to suspend intrastate rates and to grant reparation in respect to such rates.

Asked whether or not the logic of his position in regard to intrastate rates would not lead to the conclusion that Congress could take away from the state commissions all of their powers and confer them on the Interstate Commerce Commission, he said that he thought legally and constitutionally this was so, but that it would not be a wise thing to exercise this power; that as to rates only should this power be definitely vested exclusively in the Interstate Commerce Commission.

Mr. Thom was asked whether the first federal employee case in the Supreme Court did not conflict with his theories. He said that it did absolutely, but that he believed that since rendering that opinion the Supreme Court had gotten away from the contention in that case, and he cited the safety appliance act, which act the Supreme Court held as applying to a state train as well as to an interstate train. The Shreveport case plainly indicated that the federal commission had the power to correct discrimination, but Mr. Thom contended that now this doctrine should be extended so that the power of the Interstate Commerce Commission over intrastate rates could and would be used to prevent wrongs as well as to correct them.

Members of the committee were eager to press Mr. Thom to the logical conclusion of his theories. He was asked whether Congress under his theory could except railroads from state taxes. He said he believed Congress could; in fact, that Congress could treat a railroad just as it could treat a national bank. A state had a right to be protected against any other state. The national legislature was not a foreign body, but represented the individual states just as much as a town councillor represented his community; that the duty, therefore, of the national legislature was to legislate in favor and in fairness to all the states and not to permit one state to discriminate against or lay unfair burdens on the other states.

Mr. Gompers Against Compulsory Arbitration

Samuel Gompers, president of the American Federation of Labor, testified before the committee on October 4 in opposition to any provision that may be inserted in the railroad bill providing for compulsory arbitration. His testimony was similar to that presented before the Senate committee previously, and his position led to a sharp clash with Representative Webster of Washington, who questioned Mr. Gompers as to what he would do if Congress should pass an anti-strike law and the law were held constitutional by the courts. After attempting to evade a direct answer, Mr. Gompers said he thought he would obey such a law, but he

was sure the working men would not. In reply to continued questions he said that he would not counsel obedience to such a law but would remain silent, advising organized labor to appeal to the country by trying to select a Congress that would repeal the law. It is impossible, he said, to prevent men from quitting their employers, no matter what law makes them lawbreakers.

Urged to state his position regarding the Plumb plan, Mr. Gompers finally asked that the committee should not press him for a statement at this time. Arbitration, he said, must be voluntary or it cannot be successful, and labor must always have the right to strike. Mere discussion of such legislation is likely to produce serious consequences by giving the radical element the means of undermining the more conservative element.

Following is part of the colloquy between Mr. Webster and Mr. Gompers, as taken from the record:

"Mr. Webster: It is my purpose to make some observations in Congress upon your testimony, and I have not the slightest purpose to misquote you or to misconstrue anything you say. I want you to keep me from doing that by telling me frankly, without any qualification or condition, just what your position is. I had gotten the impression from the newspaper reports of your testimony before the Senate committee that you had in effect taken the position that you would defy the laws of your country. Of course, I would not act upon that, and I should like before this committee, speaking in an official capacity, to ask you this question, and I want you to give me a fair answer so that there will be no possibility of misconstruction of what your position is.

"Suppose this Congress should incorporate in the bill that we now have under consideration some provision or provisions relating to compulsory arbitration and denying to some extent or qualifying your right to strike, and that law should be tested through the ordinary channels and in accordance with the established procedure to the point where the Supreme Court of the United States declared that law in all respects to be constitutional and valid, would you advise the men constituting the organizations which you represent to go counter to the provisions of that law so interpreted and construed by the Supreme Court of the United States?"

"Mr. Gompers: The question that has been propounded is one to which I have made answer.

"Of course, I do not think that I shall ever again work as a wage-earner in a factory; it would be simply impossible, that is, for practical purposes. I would say that if I were a wage worker I would still assert my right to quit my employment, even though in asserting that right it involved a violation of a declared constitutional statute. I would assert my right to quit work, to leave my employment, the same right as you have, sir; the same right as every other man in business has or in the law has, to quit employment, to quit his client at any time when his interest or his whim or his fancy prompt him. No one undertakes to stop any man from quitting his business."

"Mr. Webster: Would you counsel or advise the workmen to obey it?"

"Mr. Gompers: No, sir. I should probably remain quiet upon that subject and permit them to act as their judgment as law-abiding citizens directed them, but I would appeal and make the most strenuous efforts of which I was capable to secure a reversal of the Supreme Court's decision by the people through their Congressmen in the next Congress, as the decisions of the Supreme Court have been reversed in many instances by Congress and by the people."

"Mr. Webster: You have just stated that if this law should be declared constitutional, though it were your personal opinion that it was unconstitutional, that you would not advise the members of your organization to obey the law. Am I to understand from that that you would withhold the benefit of your very great influence as an expedient of labor in this country in a matter of encouraging obedience to the laws?"

"Mr. Gompers: Your question is entirely speculative and hypothetical. My work and the character of my work, my services stand. I am willing to submit them to any prejudicial opinion which may be held of me."

"Mr. Webster: Well, then, Mr. Gompers, you may answer this question for me, yes or no. The Congress of the United States places upon the statute book a law relating to compulsory arbitration and the right of labor to strike, which, in your judgment, trenches upon the constitutional right of an American freeman in that behalf, and that law is brought on for a test in the courts as to its constitutionality, and it finally reaches the Supreme Court of the United States and that tribunal declares that the law is constitutional, that the limitations placed upon the right to strike are valid and that the machinery arranged for the arbitration of disputes are valid and constitutional, would you, as the president of the American Federation of Labor, advise and counsel obedience to the law or not?"

"Mr. Gompers: Perhaps I may be entirely in error, but I think the question is unintelligibly stated. It occurs to me that it is unintelligible, that part of the question that if the Congress should enact a law for compulsory arbitration and the right to strike. What I think was intended was to prevent the right to strike."

W. N. Doak Also Opposes Compulsory Arbitration

W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, also opposed any kind of compulsory arbitration and said that Congress ought not to "start anything" that would further alienate labor and capital. He said a get-together conference between railroad operators and employees is probable after the railroads are given up by the government and that voluntary agreements without additional legislation will prove more satisfactory. He said that the organizations would not attempt to strike to force the adoption of the Plumb plan.

Return of Railroads Still in Doubt

THE RAILROAD ADMINISTRATION, Congress, and railroad men and others throughout the country are awaiting anxiously the message which President Wilson is expected to send to Congress shortly regarding his intentions as to the restoration of the railroads to private management. The Railroad Administration has been proceeding all along on the assumption that the President has not changed his mind since he stated in his message to Congress in May that the railroads would be returned at the end of the year, but whereas two weeks ago most railroad men seemed fairly certain that the transfer would take place on that date, the delay in making the formal announcement and the uncertain situation as to railroad legislation in Congress has brought about a change in sentiment and the prevailing opinion now seems to be that a postponement of the transfer is to be expected. While varying opinions have been expressed, it seems to be true that at this writing no one knows what is to happen unless it be the President and there are many who believe that he has not finally made up his mind and will not until the fate of the Cummins bill in the Senate is known with certainty.

Director General Hines submitted a report to the President on both the railroad and the legislative situation on December 9, which it is understood merely outlined the facts and prospects for the President's determination. Later Mr.

Hines submitted another report which is understood to have contained a specific recommendation, the nature of which has not been disclosed.

One theory which is being discussed is that in the event of the failure of the Senate to pass a bill by the end of the year, the President would say that he had given Congress a full opportunity to legislate and as it had been unable to agree on a program he would keep the roads for another year, thus giving satisfaction to the labor organizations. This opinion is most frequently expressed by those who believe in a further continuation of government operation.

On the other hand there appear to be many more adherents to the opinion that the President is anxious to get rid of the railroads as soon as he can do so with safety and that if the Senate should pass a bill that would make it reasonably certain that a completed bill could be put through a conference committee and be accepted by the Senate and the House in a month or so he would consider it safe to return the roads on January 1 or shortly afterward.

If the Senate fails to agree before the holiday recess or before January 1, according to this theory, the return would be postponed for a month or two or three to give Congress further time to complete its permanent legislation.

As the Cummins bill has encountered a more all-round opposition in the Senate than was expected, the chances seem to favor a delay in the return of the roads beyond the first of the year, particularly as it is no longer possible to give the railroad companies an adequate notice.

Labor Leaders Ask Two-Year Extension of Government Control

THAT THE PRESIDENT'S MIND is "still open" on the railroad question was stated by Joseph P. Tumulty, secretary to the President, to a delegation of labor leaders who called at the White House on December 17 and left a letter urging the President to set at rest rumors that he intended to return the railroads, and to retain them for at least two years. The delegation was made up of representatives of the conference of labor leaders, called by the American Federation of Labor and the officers of the train service brotherhoods that began a meeting on December 13 to consider general labor questions including opposition to the Cummins bill. Earlier in the day, headed by President Gompers of the American Federation of Labor, they had called on Senator Cummins, chairman of the Senate committee on interstate commerce and asked him to withdraw the Cummins bill and give government operation of the railroads a "fair and thorough test" in peace time.

The letter to the President was as follows:

"Proponents of the Cummins bill for the immediate return of the railroads with a high guaranteed compensation are attempting to justify this bill by asserting that it is your plan to return the railroads to their owners by January 1, 1920, and that some legislation providing for such return must be enacted immediately.

"We believe that this assertion is a great injustice to you. As you will doubtless know, an overwhelming majority of the farmers, of the members of the American Federation of Labor, of the railway brotherhoods, as well as of the general public, favor an extension of the period of government operation of the railroads for at least two years, in order that a fair test may have been made of government operation and a plan may be worked out for the ultimate disposition of the railroads which would be fair to all interests involved. Such recommendation was made by Mr. McAdoo when director general of the railroads, who urged a five-year extension of government operation, while members of the Interstate Commerce Commission have also urged extension.

"Director General Hines and members of the Interstate Commerce Commission have shown clearly that the return of the railroads will involve an increase in freight revenue of close to a billion dollars, the rates being increased 25 to 50 per cent. This increase in rates, according to these same authorities, will be reflected in an increased cost of living of at least four billion dollars a year, possibly five billion. The American people cannot and should not stand such increase.

"Government operation, as reported by Director General Hines, showed a net profit at the rate of $168,000,000 a year for the three months prior to the coal strike.

"The Senate is now being asked to investigate serious charges against certain officials and railroads during the period of food control, and they had committed sabotage and had wilfully and purposely attempted through unfair methods while presumably serving the Government, to discredit government operation.

"We respectfully request, Mr. President, on behalf of the farmers, the American Federation of Labor and the railway brotherhoods, as well as the general public, that you stop the rumors that you plan to return the railroads to private control, and that in view of the changed conditions and the prevalent industrial unrest you re-establish public confidence by advocating that the period of government operation be continued for at least two years, so that under peace conditions there may be a more thorough and more consistent trial of government operation, and that carefully considered plan for the ultimate disposal of the railroads may be worked out and adopted."

The letter was signed by the following:

Samuel Gompers, president of the American Federation of Labor.
George P. Hampton, managing director of the Farmers' National Council.
Warren S. Stone, grand chief of the Brotherhood of Railway Locomotive Engineers.
L. E. Sheppard, president of the Order of Railway Conductors.
Timothy Shea, acting chief of the Brotherhood of Locomotive Firemen and Engineers.
W. G. Lee, president, Brotherhood of Railway Trainmen.
Fred J. Chamberlain, representative of Washington, Oregon, Idaho and Colorado State Granges.
H. A. Fuller, vice-president of the American Society of Equity.
O. H. McGill, Seattle Cooperative Shingle Mills.
Martin F. Ryan, Brotherhood of Railway Carmen of America.
J. W. Kline, general president, International Brotherhood of Boiler Makers, Drop Forgers and Helpers.
Wm. H. Johnston, International Association of Machinists.
N. P. Alifas, International Association of Machinists, chairman.
George A. Luther, secretary, Brotherhood of Railway Clerks.
H. E. Wills, Brotherhood of Locomotive Engineers.
B. M. Jewell, acting president Railway Employees' Department.
Rolla S. Sextob, American Federation of Labor.
Henry Sterling, American Federation of Labor.
John T. McCrudden, Brotherhood of Railway Clerks.
R. T. Wood, U. B. of Maintenance of Way Employees and Railway Shop Laborers.
T. M. Pierson, Order of Railroad Telegraphers.
Charles J. McCowan, Brotherhood of Boilermakers.
W. N. Doak, Brotherhood of Railroad Trainmen.
W. M. Clark, Order of Railway Conductors of America.
W. L. McMenimen, Brotherhood of Railroad Trainmen.
P. J. McNamara, Brotherhood of Locomotive Firemen and Enginemen.

Mr. Hampton, Mr. Stone and W. H. Johnston acted as spokesmen and expressed similar sentiments.

In addressing Senator Cummins, Mr. Gompers said that organized labor wanted the government to retain control of the railroads for two years "for the purpose of testing out the best method for their continued operation" and, referring to the anti-strike provisions of the bill, he said the proposal was "filled with the gravest consequences. It will not stop strikes but will make respected citizens law-breakers." George P. Hampton, Fred J. Chamberlain and H. E. Wills also spoke.

Senator Cummins said he had no authority to withdraw the bill but offered to lay the request before the committee.

October Earnings and Expenses

THE OPERATING STATISTICS SECTION of the Railroad Administration has published figures covering the financial results of operation for October for all Class I roads in federal operation. These comprise 232,149 miles of road, or 97 per cent of the total of 240,177 miles of road federally operated. The condensed income account is as

	Month of October		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$503,488,334	$484,372,562	$19,115,772	3.9
Operating expenses	399,400,554	378,975,377	20,425,177	5.4
Net operating revenue	104,087,780	105,397,185	d1,309,405	..
Taxes, rents, etc.	27,128,003	19,212,699	7,915,304	..
Net Operating income	76,959,777	86,184,486	d9,224,709	..

NOTE: d indicates decrease.

One-twelfth of the annual rental due the companies covered by the report amounts to $74,356,354, so that the net profit to the government was $2,603,423.

"In this connection it should be observed," the statement says, "that on account of the restoration on October 1 of car per diem charges the equipment rents in October, 1919, included $6,000,000 car per diem debits, while the corresponding credits to other railroads on account of October transportation, will not appear until November; also that there was a large amount of revenue estimated to be not less than $3,000,000 from coal traffic transported in October, which is not included in the October revenues because, on account of the then impending coal strike such coal traffic was held in transit in the last few days in October and the revenues shown on the waybills relating thereto were not taken into account for the month. The net result of these two items would be to add approximately $9,000,000 to the net operating income as stated above, which would result in a net profit to the government of $11,603,423.

"In making comparison with last year it should be noted that freight and passenger rates are on substantially the same basis in both years. The expenses in October, 1918, include about $12,800,000 back pay applicable to prior months, but they do not, on the other hand, reflect the increases to quite a number of classes of employees granted subsequent to October, 1918, which are included in the October, 1919, expenses. In addition the expenses for October, 1919, include about $4,800,000 back pay applicable to previous months."

There was an increase in the revenue and non-revenue ton miles during the month compared with the corresponding month of 1918 for the first time since January, 1919.

The results for the 10 months ended October 30 were:

	10 months ended Oct. 31		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$4,234,992,130	$3,985,178,160	$249,813,970	6.3
Operating expenses	3,556,720,774	3,201,838,204	354,882,570	11.1
Net operating revenue	678,271,356	783,339,956	d105,068,600	..
Taxes, rents, etc.	199,288,721	183,363,173	15,925,548	..
Net operating income	478,982,635	599,976,783	d120,994,148	..
10/12 of annual rental	743,563,540	743,563,540	.....	..
Operating loss	264,580,905	143,586,757	120,994,148	..
Operating ratio	84.0	80.3	3.7	..

NOTE: d indicates decrease.

The comparison between the ten months' periods is substantially affected by the fact that the rate increases, approximately 25 per cent, which were in effect this year, became effective for passenger and freight traffic respectively the middle and latter part of June, 1918, and also by the fact that numerous important wage increases which were effective for all of 1919 were effective for only part or none of 1918.

Ore Loading Docks on the Great Lakes

THROUGH THE COURTESY of W. A. Clark, chief engineer of the Duluth & Iron Range and the Duluth, Messabi & Northern, we are able to publish the following table of statistics relative to ore-loading docks situated on the Great Lakes. This table has been revised to May 1, 1919, and shows the locations, numbers and capacities, etc., of all of the docks in use up to that date:

ORE LOADING DOCKS ON THE GREAT LAKE

Railway	Location	Dock No.	Number of pockets	Capacity per pocket in tons	Storage capacity in gross tons	Height of water to deck of dock	Width of dock outside to outside of partition posts	Length of dock	Angle of pockets	
A. C. & H. B.	Michipicoten, Ont.	1	12	...	.....	43 ft. 4 in.	25 ft. 0 in.	311 ft. 9 in.	44° 0′	
C. M. & St. P.	Escanaba, Mich.	1	240	175	42,000	66 ft. 6 in.	52 ft. 0 in.	1,500 ft.	45° 0′	
C. M. & St. P.	Escanaba, Mich.	2	240	200	48,000	69 ft. 2 in.	54 ft. 0 in.	1,500 ft.	45° 0′	
	Total	..	480	...	90,000	.....	.....	.....	.....	
C. N.	Key Harbor, Ont.	1	20	100	2,000	61 ft. 9 in.	28 ft. 0 in.	240 ft. 0 in.	37° 30′	
C. & N. W.	Escanaba, Mich.	3	226	125	28,250	52 ft. 8 in.	37 ft. 0 in.	1,356 ft.	45° 0′	
C. & N. W.	Escanaba, Mich.	4	250	125	31,250	59 ft. 2 in.	37 ft. 0 in.	1,500 ft.	45° 0′	
C. & N. W.	Escanaba, Mich.	5	370	250	92,500	70 ft. 9 in.	52 ft. 2 in.	2,200 ft.	45° 0′	
C. & N. W.	Escanaba, Mich.	6	320	250	80,000	70 ft. 0 in.	50 ft. 2 in.	1,920 ft.	45° 0′	
C. & N. W.	Ashland, Wis.	1	290	250	72,500	72 ft. 1 in.	50 ft. 2 in.	1,740 ft.	45° 0′	
C. & N. W.	Ashland, Wis.	2	278	200	55,600	70 ft. 4½ in.	50 ft. 2 in.	1,668 ft.	45° 0′	
C. & N. W.	Ashland, Wis.	3	200	250	50,000	73 ft. 5¼ in.	52 ft. 2 in.	1,200 ft.	45° 0′	
	Total	..	1,934	...	410,100	.....	.....	.....	.....	
D. & I. R.	Two Harbors, Minn.	1	224	250	56,000	74 ft. 0 in.	51 ft. 8 in.	1,376 ft.	48° 0′	Steel and concrete
D. & I. R.	Two Harbors, Minn.	2	228	300	68,400	80 ft. 0 in.	56 ft. 8 in.	1,400 ft.	48° 0′	Steel and concrete
D. & I. R.	Two Harbors, Minn.	5	168	150	25,200	66 ft. 9 in.	49 ft. 0 in.	1,050 ft.	43° 32′	
D. & I. R.	Two Harbors, Minn.	6	148	250	37,000	73 ft. 0 in.	51 ft. 3¼ in.	920 ft	45° 0′	Steel and concrete
	Total	..	768	...	186,600	.....	.....	.....	.....	
D. M. & N.	Duluth, Minn.	3	384	150	57,600	67 ft. ½ in.	59 ft. 0 in.	2,304 ft.	45° 0′	
D. M. & N.	Duluth, Minn.	4	384	200	76,800	72 ft. 6 in.	57 ft. 0 in.	2,304 ft.	45° 0′	
D. M. & N.	Duluth, Minn.	5	384	300	115,200	80 ft. 5 in.	56 ft. 0 in.	2,304 ft.	47° 30′	Steel and concrete
D. M. & N.	Duluth, Minn.	6	384	400	153,600	84 ft. 5 in.	60 ft. 0 in.	2,304 ft.	47° 30′	Steel and concrete
	Total	..	1,536	...	403,200	.....	.....	.....	.....	
D. S. S. & A.	Marquette, Mich.	5	200	225	45,000	70 ft. 10 in.	51 ft. 0 in.	1,236 ft.	45° 0′	
G. N.	Superior, Wis.	1	374	300	112,200	73 ft. 0 in.	62 ft. 8 in.	2,244 ft.	45° 0′	
G. N.	Superior, Wis.	2	350	300	105,000	73 ft. 0 in.	62 ft. 8 in.	2,100 ft.	45° 0′	
G. N.	Superior, Wis.	3	160	300	97,800	77 ft. 0 in.	59 ft. 8 in.	960 ft.	47° 30′	
G. N.	Superior, Wis.	3	166	300		73 ft. 0 in.	62 ft. 8 in.	996 ft.	45° 0′	
G. N.	Superior, Wis.	4	302	300	90,600	75 ft. 0 in.	62 ft. 6 in.	1,812 ft.	47° 30′	Steel and concrete
	Total	..	1,352	...	405,600	.....	.....	.....	.....	
L. S. & I.	Marquette, Mich.	2	200	250	50,000	75 ft. 0 in.	54 ft. 0 in.	1,200 ft.	45° 0′	Steel and concrete
M. St. P. & S. S. M.	Ashland, Wis.	1	314	100	31,400	66 ft. 2 in.	36 ft. 0 in.	1,908 ft.	50° 45′	
M. St. P. & S. S. M.	Ashland, Wis.	2	150	350	52,500	80 ft. 0 in.	59 ft. 0 in.	900 ft.	47° 30′	Reinforced concrete
M. St. P. & S. S. M.	Superior, Wis.	1	402	300	120,600	78 ft. 0 in.	58 ft. 0 in.	2,412 ft.	47° 0′	
	Total	..	866	...	204,500	.....	.....	.....	.....	
N. P.	Superior, Wis.	1	102	350	35,700	80 ft. 0 in.	57 ft. 2 in.	684 ft.	47° 30′	Steel and concrete
	Ext. 3h of	1	100	350	35,000	80 ft. 0 in.	59 ft. 2 in.	600 ft.	47° 30′	Reinforced concrete
	Total	..	202	...	70,700	.....	.....	.....	.....	

General News Department

Plans for a bridge at Detroit over the Detroit river recently reported as under discussion are assuming a more definite form, following investigations of the project. The American and Canadian corporations that are interested in the construction of a bridge have established a joint board. Gustave Lindenthal, consulting engineer, New York city, has been made consulting engineer of this board, and Charles Evan Fowler, consulting engineer, New York city, has been made chief engineer. The plans provide for a double deck bridge, carrying both highway and railway traffic with a central span of 1,800 ft. or 2,400 ft., depending upon the location adopted.

Recent press despatches from Winnipeg, Man., have indicated that members of the Brotherhood of Railway Trainmen and the Order of Railway Conductors have made a new agreement with the Canadian Pacific providing for increases in wages; but an officer of the Railway Association of Canada says that the agreement is only a local adjustment of rates of pay and working conditions for trainmen and conductors as provided in a supplement to the McAdoo award. The association officer has further announced that there are no negotiations either in progress or pending looking to any general increase in wages for Canadian railway employees.

The map of the railroads operated by the Canadian Government, printed in the *Railway Age* dated November 7, page 906, should have shown also the Temiskaming & Northern Ontario, which is an important north and south connection between the new trans-continental line and the older portions of the Canadian railroad system. The Temiskaming & Northern Ontario is owned and operated, not by the Dominion but by the Ontario Provincial Government. The main line extends from North Bay, on the line from Ottawa to Sudbury, northward 254 miles to Cochrane, which is a division point on the Trans-Continental, about 60 miles west of the boundary between Quebec and Ontario.

The Order of Railroad Station Agents has issued a circular discussing certain sections of the Esch bill, recently passed by the House of Representatives. The sections of the bill which the circular treats are those legalizing the machinery used by railroads and their employees before and during federal control for the settlement of wage and working condition disputes. The circular, after briefly outlining the plan contained in the bill for the settlement of labor disputes, says: "No provisions seem to have been made for a representation on the boards of adjustment of the thousands of railroad agents and the station supervisory forces and it becomes a matter of personal importance to every agent that he should be represented by one of his class. The station supervisory forces greatly outnumber the machinists, blacksmiths, sheet metal workers, electrical workers and switchmen. Unless we have a representative on one of these boards of adjustment our cases will be decided by a telegrapher, a clerk, a switchman, a maintenance of way and shop laborer and four railroad representatives." The circular closes with an earnest appeal to station agents and station supervisory officers to protest against the apparent oversight and to demand representation on one of the adjustment boards.

Minneapolis Track Plans

An ordinance requiring the depression of the tracks of the Chicago, Milwaukee & St. Paul in Minneapolis, Minn., and calling for the elevation of the city streets over the tracks is now pending before the Minneapolis city council. The ordinance is practically a compromise in a discussion between the city of Minneapolis and the Chicago, Milwaukee & St. Paul relative to the matter of separating grade crossings which has been in progress since 1916. At that time an ordinance was introduced and adopted by the city council requiring this road to depress its tracks and carry them under certain streets and avenues. This ordinance was resisted in the United States Court by the railroad company and was consequently held to be void.

New York Railroad Club

William L. Chenery, one of the editors of "Survey," will conduct an open forum to discuss The Industrial Conflict at the next meeting of the New York Railroad Club on Friday evening, December 19, 1919, at 29 West 39th street, New York City.

The Tie Merchants

The National Association of Railroad Tie Producers will hold its annual meeting at the Hotel Sherman, Chicago, on February 12 and 13, 1920, in conjunction with the annual meeting of the American Wood Preservers' Association. The program for this meeting is now in preparation.

An Idealist's View

The railroads should be compelled to adhere to their function as carriers. Let us demand that freight rates be based scientifically on the cost of service and that all agencies be co-ordinated and made to have proper arrangements for the inter-change of traffic. Let us see to it that the powers granted are rightfully used ,and that the expenditures for development are justified by proper service; that any route to be developed, railway, waterway, or highway, shall be worthy of development and when developed be used for the public service at rates which can be defended as representing the cost of the service rendered. Let the Federal agency be truly an inter-state commerce agency and not simply a regulator of railways. Can we not learn a lesson from the war? Is there not a golden mean between the unthinking machine developed by autocracy and the extreme individualism of democracy? Have we not had proof of the necessity for concerted action where great public issues are involved? Should we not have a Department of Transportation charged with the development and co-ordination of all the transportation agencies of the nation?—*Maj. Gen. W. M. Black.*

American Association of Engineers' Position on Unionism

The American Association of Engineers has issued a statement of its position with reference to trade unionism in the profession. The following is an abstract from this statement:

"Production should be increased—not limited. The profession cannot support strikes or lockouts or any other methods that may benefit any class at the expense of the nation as a whole.

"Rewards should be according to ability, initiative and constructive effort. Men are not equal in these respects. Each man should be encouraged to do his utmost and be given compensation according to ability and will to increase production and to achieve large results.

"The engineer, as an educated professional man, believes in basing his claims for proper and just reward for his services upon the justice of the facts presented, upon enlightenment of public opinion, upon loyalty between employer and employee, and upon the underlying fundamental desire of the great majority to do what is fair and right when the merits of the case in question are clearly presented and demonstrated. We believe in organized representation for

the correction of wrong, the advancement of the profession and service to the public, but are opposed to methods inconsistent with the dignity of the profession and which would lessen public confidence."

Canadian People Operating Canadian Railways

Employees may be represented on the governing board of the Canadian National Railway System; this was intimated in a recent address by Sir Robert Borden, Prime Minister of the Dominion of Canada, to the legislative board of the Brotherhood of Locomotive Firemen and Engineers. Sir Robert said, in part:

"In a country of vast area and scattered communities the problem of transportation is all important, and the efficiency of transportation in Canada is an essential factor in the national life. About one-half the total railway mileage of Canada is, or shortly will be, in the ownership of the state. You must realize, and I hope you will agree, that this condition emphasizes the importance of devising some means by which this great essential and national activity shall not be interrupted or prejudiced by disputes between employers and employed. Even as between a private corporation operating a great public utility and its employees there should be some more reasonable method than the imposition upon the general public of the inconvenience, the loss and the suffering which are occasioned by strikes. If, between jealous and sometimes antagonistic nations, the principle of settling international disputes by peaceful means has been acknowledged and adopted, surely disputes between employers and employed can be investigated and adjusted by means other than those which may bring upon the whole people distress and suffering comparable to that entailed by war. So far as railways in the ownership of the state are concerned, there is one additional consideration of which you should not lose sight. Those responsible for the administration of state railways are not actuated or influenced therein by any motive of private interest. Their duty is on the one hand to the public whom they serve, and on the other hand to the employees, who also serve the same public. So that in this instance employers and employed alike serve the people as a whole.

"I commend to your most thoughtful consideration the results which have been obtained in this country by the establishing of the tribunal known as Board of Adjustment No. 1, in connection with the Canadian Railway War Board. The Board has given decisions in 52 cases, as well as 6 supplementary cases, or in all 58 disputes which have thus been settled without resort to strike. In addition, about a dozen potential disputes have been adjusted through the good offices of the Board without the necessity of a formal hearing. Disputes have also been adjusted for organizations which were not parties to the agreement. It is open to any class of railway or transportation employees to present a case to the Board, provided they agree to be bound by its decision.

"Is there not in this record food for the most careful reflection and consideration as to the future determination of disputes between organizations of railway employees and those responsible for the administration of the railways? In other countries there have recently been legislative proposals for the prohibition of strikes. It would not be my purpose to have the question approached in that way. The members of the railway organizations are citizens of this country, interested like others in its development, its progress and its orderly government. Any movement to make permanent and still more efficient the methods which have had such good results during the past eighteen months might well originate with them. This obligation is imposed and this responsibility is created not only by the power and influence of the organizations in question, but by the duty which their members owe to the state as good citizens. On our part we must not be unmindful of corresponding obligations. The problem of administering about 22,000 miles of railways in this country is one of exceptional moment and difficulty. Upon its successful solution probably depends the success of state ownership, not only in Canada but upon the whole North American continent. We must give earnest attention to some means by which the employees shall have just representation in the executive administration of this great system. I have given to this question some study in the consideration of the problem as a whole and you may be assured that such a proposal will command my entire sympathy."

Traffic News

At Evansville, Ind., cattle are coming into the stockyards in box cars, the shippers having been unable to obtain cattle cars.

M. T. Scanlan, commercial agent for the Chicago, Lake Shore & South Bend, with office in Chicago, has been appointed commercial agent for the Chicago, Racine & Milwaukee, with the same headquarters.

The Traffic and Transportation Association of Pittsburgh, Pa., at its monthly meeting at the Fort Pitt Hotel on December 4, elected the following officers: President, H. N. Holdren, assistant traffic manager, Pittsburgh-Des Moines Company; vice-president, S. R. Hosmer, Jones & Laughlin Steel Company; financial secretary, S. C. Corfield, traffic manager, Columbia Steel & Shafting Company; recording secretary, A. C. Schweitzer, Carnegie Steel Company; custodian, H. B. Parmelee, Carnegie Steel Company; treasurer, J. F. Sturm, National Tube Company; executive committee, W. H. Patton, Pittsburgh & Lake Erie Railroad Company; S. S. McKeever, W. H. Walker & Company; F. G. Wood, Canadian National Railways Company; G. H. Waggoner, Stalnaker Steel Company; R. J. Zinsmeister, W. H. Herman Company.

The director general announces that an understanding has been reached between the United States Shipping Board and the Railroad Administration in the matter of storage or demurrage charges on export coal and freight, moving via North Atlantic ports under through bills of lading, under which these charges will be assumed by the party at fault—the shipper, the inland carrier, or the ocean carrier. He has also announced the names of members of the Trans-Atlantic Associated Freight Conference, which constitute practically the entire membership, also independent steamship lines or operators (not members of the associated conferences) that have agreed to become parties to the same understanding. It is expected that it will be possible to publish necessary amendments to tariffs, so that this arrangement may become effective not later than December 29.

The Cunard steamship line, and allied interests are credited by a New York paper with having made substantial progress with plans for the establishment of an immense freight terminal at Weehawken, N. J., the west side of the Hudson River, opposite 42d street, New York, which probably will dwarf anything of the same character now existing in New York. It is stated, on the authority of persons familiar with the project, that negotiations in progress for some time may be expected to mature in the spring. The proposed development will include the entire Weehawken frontage on the Hudson from the West Shore ferry slips south to the Erie Railroad piers. It does not involve any change in connection with the larger ships of the Cunard and allied lines, which dock at the Chelsea piers below Twenty-third street, New York. The new piers will have electrical and mechanical equipment equal to the best.

Coal Allowed for Ocean Vessels

Restrictions against the delivery of coal for bunkerage were removed on December 15 by the Railroad Administration, which will permit delivery in the following order of priority under the permit system: (1) Inland and coastwise vessels; (2) American ocean vessels; (3) foreign vessels.

Causes of Mail Delay

The post office department has issued a statement concerning train delays. It says that during the four weeks from February 16 to March 15, 1919, the number of letters delayed in the railway mail service as the result of being undistributed, from various causes, were 2,810,000, the delay ranging from one hour to twenty-four hours in reaching destination. During this same period there were 40,000 trains due to make connections that were missed. The number of letters delayed as a result of these failures of trains to main-

tain schedule connections aggregates over 35,000,000. The delay of 2,810,000 letters, as a result of being undistributed, was due for the most part to the clerks receiving mails from delayed trains in greater volume than they were prepared to handle. In November, 1917, there were 87,000 failures of mail trains to maintain their schedule connections, or more than double the number that occurred in March, 1919.

Coal Production

Bituminous coal production during the week ending December 6, according to the weekly report of the Geological Survey, was 43.5 per cent of normal, or less than at any time since the first two weeks of the strike. Compared with the fourth week, when the wage negotiations were broken off, the tonnage per working day fell off 8 per cent. The revised figures show that production during the first week of the strike was 29.6 per cent of normal, during the second week 33.3 per cent, during the third week 44.5 per cent, and during the fourth week 47.3 per cent. The total output for the week ending December 6, including lignite and coal coke, was 5,259,000 net tons. The average during the four weeks ending October 25, which may be regarded as normal, was 12,089,000 tons. The report says that production during the week reflected the state of the industry at a time when negotiations had been broken off because this was the period after the Central Interstate Wage Conference had adjourned after failing to reach an agreement. Comparatively few of the striking miners accepted the proffered increase of 14 per cent. and returned to work, while many mines which had resumed operations during the Washington negotiations had again shut down, notably in Wyoming, West Virginia, and the Cumberland-Piedmont field.

St. Paul Business Men

The St. Paul (Minn.) Association of Public and Business Affairs, having discussed the general railroad problem, has adopted resolutions advocating:—

"(1) That in returning the railroads Congress make liberal provision for refunding the indebtedness of the railway companies to the government on account of the creation by the government of additions and betterments upon railway property, the cost of which has been charged to the carriers, in order that all current assets may be forthwith available, for the betterment of transportation facilities; that until railway credit has been reestablished by such a readjustment under the supervision of a federal commission of railway revenues and expenses as will result in net earnings sufficient to attract the new capital required for the creation of additional facilities and the acquisition of needed equipment, the compensation guaranteed to the carriers during federal control be continued, and, if necessary to provide such capital, the government loan same to the carriers at reasonable rates of interest;

"(2) That the Interstate Commerce Commission be clothed with broader and more general authority over all rates, to the end that it may fix minimum and maximum rates, co-ordinate interstate and state rates, and thus bring about a more uniform, fair and non-discriminatory scale of rates throughout the country;

"(3) That some effective federal agency be created as the final arbiter in wage disputes and that lockouts and strikes be prohibited during the consideration and determination by such agency of any disputes;

"(4) That the Federal Commission be given exclusive supervision and control over the issuance of railway securities, with authority, when the public interest will be served, to permit consolidation of railways and railway facilities and service.

"In the judgment of the St. Paul Association the above deemed essentials can be best accomplished by amplifying and extending the jurisdiction and authority of existing governmental agencies rather than by the creation of new agencies; that the demand of the public is not for more regulatory machinery, but for a better transportation machine, more fully and adequately equipped, affording service, uninterrupted by strikes and lockouts, under the regulation of such effective governmental agencies as will at the same time protect railway capital, secure fair wages for the employees and protect the public against undue exaction from either railway companies or the employees thereof."

Commission and Court News

State Commissions

THE SOUTHERN RAILWAY COMPANY has petitioned the Public Utilities Commission of Illinois for a modification of supplemental Order No. 1 to General Order No. 55, so that only one crossing sign need be maintained at highway crossings that are not "extra hazardous."

Court News

Crossing Accident—Standing Train

The Vermont Supreme Court holds that a railroad company is not liable for injuries to an automobile, the driver of which in coming down a steep hill at night, by reason of the slipery condition of the oiled road, was unable to stop on discovering a standing train on the crossing, whereby the automobile hit the train just as the latter was starting, though the railroad took no precautions to avoid such injury. The railroad's servants would be amply justified in acting on the belief that travelers in automobiles properly lighted and driving at reasonable speed would observe the cars on the crossing in time to avoid a collision.—Gilman v. Central Vermont (Vt.) 107 Atl. 122.

Interstate Commerce Act—Grain Elevators

The Oklahoma Supreme Court holds that by reason of the provisions of the act to regulate commerce (U. S. Comp. St. § 8563) the State Corporation Commission is without jurisdiction to require a railroad to designate a point on its right of way for the location of a portable grain elevator and to spot cars thereon for interstate shipments, when the effect of such order is to obstruct interstate commerce by materially interfering with the movement of cars to and from elevators permanently located near the right of way, and with the loading of cars on the right of way by track shippers.—Rock Island v. State (Okla.) 180 Pac. 246.

Demurrage

To a railroad's claim for demurrage on interstate shipments of ore to the defendant on an interchange track at its works at Kittanning, the defense was that, during the time charged for the railroad's tracks were so flooded as to suspend the road's operations. The interchange tracks, however, were not flooded, and there was no difficulty in the consignee returning the cars to the interchange track. It was claimed that as the railroad could not have removed the cars, or in any manner make use of them, it could not charge demurrage for the consignee's failure to deliver them there. The Pennsylvania Supreme Court held that this claim could not be sustained.—Pennsylvania v. Kattinning I. & S. Mfg. Co. (Pa.) 106 Atl. 207.

Limiting Liability to Carrier's Own Line

In an action by a shipper of live stock against an initial carrier for damages in transit, it appeared that the stock was shipped over the lines of connecting carriers, but each carrier made an independent contract with the shipper. The shipment was intrastate, and moved from Graham, Tex., to Ft. Worth over the Rock Island, thence to Sweetwater over the Texas & Pacific, thence to Post over the Panhandle & Santa Fe. The through rate was paid to the Rock Island, which limited its liability to its own line. The Texas Court of Civil Appeals holds that Texas Rev. St. 1911, Arts. 731, 732, relating to contracts for through shipment, recognized or acquiesced in by the carriers, had no application, and the Rock Island was not liable for damages accruing upon the lines of the connecting carriers.—Rock Island v. Hallam (Tex.) 211 S. W. 809.

United States Supreme Court

State Legislature's Power to Leave Question of Contributory Negligence to Jury

In an action against the Rock Island for knocking down and killing a person who stepped upon the track when a train was approaching in full view, the Supreme Court of the United States, per Mr. Justice Holmes, says on appeal from a judgment of the Oklahoma Supreme Court, that it may be assumed, as the State court assumed, that if the question were open for a ruling of law it would be ruled that the plaintiff could not recover. But the Oklahoma Constitution provides that "the defense of contributory negligence or of assumption of risk shall, in all cases whatsoever, be a question of fact, and shall, at all times, be left to the jury." Art. 23, Sec. 6. The case was left to the jury, and they found a verdict for the plaintiff. Judgment was entered for her and was affirmed by the Supreme Court of the State, which held that the provision applied to the case and that when so applied it did not contravene the Fourteenth Amendment.

The Supreme Court of the United States holds that the railroad had only such right to the defense as the State Constitution allowed. Conceding that legislation cannot change the standard of conduct which is matter of law in its nature into matter of fact, the material element in the Oklahoma constitutional enactment is not that it called contributory negligence fact, but that it left it wholly to the jury. Judgmen for the plaintiff was affirmed.—Rock Island v. Cole. Decided December 8, 1919.

Compensation for Carrying the Mails

The New York, New Haven & Hartford sued the United States to recover the difference between amounts received through the Post Office Department and what it claimed should have been paid for its services in carrying the mails during a series of years, ending June 30, 1914. The demand was based on implied contracts alleged to arise from the following circumstances: First—Acceptance and transportation of the mails in reliance upon section 4002, Revised Statutes, as amended. This directs payment of specified sums per mile per annum according to weights; and the claim was that because the Post Office Department improperly construed and applied it, the railroad received much less than it should have received. Second—Acceptance and transportation of the mails under orders and coercion of the Post Office Department, followed by failure to allow reasonable compensation. The railroad claimed its property was taken for public use and adequate compensation must be paid.

Concerning the challenged interpretation and application of section 4002 R. S. resulting in payments during each four-year term on the basis of weights taken immediately prior to the beginning of the same instead of annually, the Supreme Court of the United States holds (opinion by Mr. Justice McReynolds) that the action taken accords with prior practice followed for many years; the letter of the statute permits it; the carrier submitted with full knowledge; and, impliedly at least, it was sanctioned by the Supreme Court in D. L. & W. v. United States, 249 U. S. 385. The court thought it must be held as settled that prior to the Act of July 28, 1916, Ch. 261, 39 Stat. 412, 419—with the exception of certain roads aided by land grants—railroads were not required by law to carry the mails. (Eastern v. United States 129 U. S. 391, 394; Atchison, T. & S. F. v. United States, 225 U. S. 640, 650; D. L. & W. v. United States, supra.) And as the railroad voluntarily accepted and performed the service with knowledge of what the United States intended to pay, it cannot now claim an implied contract for a greater sum. It may be, the court says, that any railroad by failing to carry the mails would incur the hostility of those living along its lines and as a consequence suffer serious financial losses; but the fear of such results does not amount to compulsion by the United States and cannot constitute the basis of a justiciable claim against them for taking property. The judgment of the Court of Claims dismissing the petition on demurrer (53 Ct. Cl. 222) was affirmed, Mr. Justice Brandeis dissenting.—N. Y., N. H. & H. v. United States. Decided December 8, 1919.

State Statute Imposing Penalty for Overcharge of Authorized Passenger Fare Upheld

By an Arkansas statute regulating rates for the transportation of passengers between points within the state, any railroad company that demands or collect a greater compensation than the statute prescribes is subjected "for every such offense" to a penalty of "not less than $50 nor more than $300 and costs of suit, including a reasonable attorney's fee," and the aggrieved passenger is given a right to recover the same in a civil action. In June, 1915, the St. Louis, Iron Mountain & Southern demanded and collected 66 cents more than the prescribed fare from each of two sisters returning to their home from a school commencement; and in suits separately brought, and afterwards consolidated, these passengers obtained judgments against the company for the overcharge; a penalty of $75 and costs of suit, including an attorney's fee of $25. The company appealed, asserting that the provision for the penalty was repugnant to the due process of law clause of the Fourteenth Amendment; but the Supreme Court of the state sustained the provision and affirmed the judgments. 131 Ark. 442. The railroad took the case to the Supreme Court of the United States.

The grounds on which the provision was said to contravene due process of law were, first, that the penalty was "so severe as to deprive the carrier of the right to resort to the courts to test the validity" of the rate prescribed, and, second, that the penalty was "arbitrary and unreasonable, and not proportionate to the actual damages sustained." The Supreme Court said, however, per Mr. Justice Van Devanter, that it did not appear that the carrier had not been afforded an adequate opportunity for safely testing the validity of the rate, or that its deviation therefrom proceeded from any belief that the rate was invalid. On the contrary, it was practically conceded, and the court took judicial notice of the fact, that if the carrier really regarded the rate as confiscatory, the way was open to secure a determination of that question by a suit in equity against the Railroad Commission of the state, during the pendency of which the operation of the penalty provision could have been suspended by injunction. Therefore it was held the first branch of the company's contention could not prevail.

The second branch was more strongly urged. The provision assailed is essentially penal, because primarily intended to punish the carrier for taking more than the prescribed rate. Yet it was held that giving the penalty to the aggrieved passenger did not require that it be confined or proportioned to his loss or damages; for, as it is imposed as a punishment for the violation of a public law, the legislature may adjust its amount to the public wrong rather than the private injury, just as if it were going to the state. The ultimate question was whether a penalty of not less than $50 and not more than $300 for the offense in question could be said to bring the provision prescribing it into conflict with the due process of law clause of the Fourteenth Amendment. The court said: "That this clause places a limitation upon the power of the states to prescribe penalties for violations of their laws has been fully recognized, but always with the express or tacit qualification that the states still possess a wide latitude of discretion in the matter and that their enactments transcend the limitation only where the penalty prescribed is so severe and oppressive as to be wholly disproportionate to the offense and obviously unreasonable. . . . When the penalty is contrasted with the overcharge possible in any instance it of course seems large, but, as we have said, its validity is not to be tested in that way. When it is considered with due regard for the interests of the public, the numberless opportunities for committing the offense, and the need for securing uniform adherence to established passenger rates, we think it properly cannot be said to be so severe and oppressive as to be wholly disproportionate to the offense or obviously unreasonable." Judgment for the plaintiffs was affirmed, Mr. Justice McReynolds dissenting.—St. Louis, Iron Mountain & Southern v. Williams. Decided December 8, 1919.

Foreign Railway News

The Channel Tunnel

Prime Minister Lloyd George recently made the important announcement to a private deputation that the British Cabinet had decided that there was no longer any political objection to the construction of the Channel Tunnel. He was not yet in a position to say that the military objection had also been removed. The Cabinet, before coming to a final decision, had asked for the considered views of the Admiralty, War Office, and Air Force Staffs, and their reports were now being awaited.

Deisel Locomotives for the Prussian Railways

LONDON.

The Zeitschrift des Vereines Deutsche Ingenieure in commenting on the problem of electrification of the Prussian Railway system states that Prussia, Bavaria and Duchy of Baden are partial to the 15,000-volt, 16-cycles, single-phase, alternating current system, which is that used in Switzerland. In combination with electric working this road is contemplating the use of internal combustion locomotives of the Deisel type to also be used on the electrified lines, and it has already been decided that such locomotives will be built for experiment having a horse power of 3,000. It is hoped to reserve about one-fifth of the total mileage for the use of these locomotives. One of the purposes attributed to this work is that in case of war these locomotives could be used over any tracks, even though electric power was not available.—*Le Genie Civil.*

Market for Light Railway Material in China

A number of native coal companies in China whose mines are adjacent to the Shantung railways, writes Vice Consul N. F. Allman, Tsinanfu, are now negotiating for the construction of light railways to connect their mines with the above line. The approximate total length of the light railways to be constructed is 50 miles; 25 miles of which have already been surveyed. The Chinese mine owners are desirous of obtaining American materials, if possible, and the dealers in railway material that may be interested would be expected to furnish complete equipment, including locomotives and several hundred coal cars. Good second-hand equipment would be acceptable for one of the lines, about 12 miles long, the material for which would have to be delivered immediately. The material for the other lines is desired not later than February, 1920.

(The names of two firms in this district who correspond in English and who are interested in negotiating direct for the proposed light railways, may be obtained, says Commerce Reports, from the Bureau of Foreign and Domestic Commerce or its district and co-operative offices. Refer to file No. 126417.)

Carbon Contact Trolley Bows

The Engineer states that on account of the scarcity of copper during the war, the copper contact bows of some of the electric trains in Germany were replaced by bows of aluminum, which had already been used for that purpose before the war. Aluminum, however became unobtainable, and zinc was used, but this did not answer particularly well. Experiments were then made with contact pieces of carbon. At first the wear was one gramme of carbon per 10 car-kilometers, but this was improved upon until some of the bows had reached a life of 110,000 car-kilometers. The carbon was first greased, but ultimately that was found to be unnecessary. The bows have a length of one meter and are built up of sections. The whole is mounted on a flat strip of steel plate, which is turned up on both sides so as to grip the carbon pieces, bars of cast iron are interposed between the carbon and the steel edges so as to secure good contact. In cross section the carbon is not solid and a tension device adjustable by means of screws if fitted into the hollow to press the carbon against the holder. There is less sparkling than with aluminium bows, and worn-down carbon sections can be renewed so that the carbon of the whole length of the bow is utilized.

French Engineering Society Forms British Section

LONDON.

The members of the Société des Ingénieurs Civils de France have formed a British Section which will meet periodically in London. The purpose of this section is to improve the relations between English and French engineers, not only civil, but in every branch of science. In describing the purposes of this new section, the president, T. J. Guéritte said that during the great war English and French engineers got in much closer contact with each other than at any other previous time, and it was the desire of the French and English engineers to prolong and further the kindly feeling and cooperation that had existed between the engineers of the two countries during the war. This London section will be used as a medium for keeping both English and French societies in touch with each other. The section has very broad ambitions and even contemplates arranging for the exchange of engineering students between engineering firms in both countries. Furthermore, there are many engineering questions of international importance which can be discussed between the two nations with very beneficial effect, such as the Channel Tunnel, the effect of the shortage in coal on the hydro-electrical development in France, etc. It is also the desire to make arrangements with the various English and French societies for the purpose of enlarging the foreign membership of these institutions.

The P. L. M. Disaster

The French railway companies have been very unfortunate of late in the matter of railway accidents. On September 4, 15 passengers were killed in the Toulouse express, which had stopped owing to want of steam, due, it is said, to bad coal, and was run into by a train from Bordeaux. The disaster on the P. L. M. at Pont-sur-Yonne on November 3, when the Simplon express was run into and 26 passengers killed, was, it is believed, due to the same cause. This latter accident has an interest for railway officers in that automatic signals, lock-and-block and cab signals have all cropped up as a result. The P. L. M. has, for 20 years, had some automatic signaling on the Nevers branch, 30 miles south of the site of the present accident. It schould be noted, though, that the representative of that company who was present at the Washington International Railway Congress of 1905 did not favor automatic signals because they could not do all that the human agent was capable of. Little lock-and-block has been used in France, except within what the Americans call "station limits." The military training the men have had has made them careful and no such interlocking has, therefore, been considered necessary. At the time of the outbreak of war the P. L. M. was trying a cab-signal.

Italian Railways Under Nationalization

An Italian engineer has recently published a study, reproduced in the Reforme Economique, of 14 years' experience of railway nationalization in Italy, from which the following figures are taken. In 1905 the State took over a railway system of over 11,500 km., which had previously been paying over some $12,400,000 a year to the national treasury, in the shape of a tax on profits. During the first year of State operation, this contribution had fallen to $8,900,000 and the system was being operated at a loss. Under company management, a policy of double tracking was adopted, but this work has been so slow under State ownership that 72 per cent of the mileage is still single track. Between 1899 and 1903 the companies made considerable progress with electrification; in 12 years the State has electrified only 25 miles, although electrification is especially urgent in Italy because the mountain lines, although representing only a seventh of the total mileage, consume 40 per cent of the coal used on the railways, and coal is extremely dear and scarce in the country. The same critic also contends that while the companies were very successful in the development of local traffic along the Adriatic coast, and had thus stimulated the transport of agricultural and industrial commodities to Great Britain and Central Europe, "no

serious measure" of the kind has been taken since 1905. The only appreciable increases are apparently the size of the staff and the ratio of expenses, so that "on certain lines of secondary importance the employees outnumber the passengers."

French Railways and Demobilization

Figures were recently given in the Journal des Transports, showing the very heavy traffic which the French railways have been called on to handle since the armistice in connection with demobilization. Between April 1 and October 1 last, 14,000 trains were run for the conveyance of 2,000,000 demobilized French soldiers and men on leave. A further 2,000 trains, averaging 50 cars each, were required for the transport of soldiers to garrison towns and of the war material to depots, and the addition of the trains carrying foodstuffs and other essential commodities and those run in connection with the victory celebrations brought the total for the eight months to 20,000 military trains. Approximately 9,000 trains, a large percentage of which traversed practically the whole of the country, were required for the American Army during the same period, in which the total number of the military trains amounted to about 30,000. This is exclusive of troop movements by sea; some 740,000 men and 5,000 horses were carried between France, Algeria, Morocco, the French colonies and eastern Europe. These figures have been published officially with a view to explaining why the French railways should still be so congested so many months after the cessation of hostilities. As the work of demobilization is now practically finished so far as the railway system is concerned, it is hoped that the general transport position will before long undergo an appreciable improvement.

Railway Notes from China

Peking, Oct. 23, 1919.

The Ministry of Communications apparently has now got the subject of statistical reports firmly in hand. Two annual reports covering the years 1916 and 1917 respectively, have come from the press during the present calendar year, and announcement is now made that report for the year 1918 will appear shortly. A condensed summary of the report has been given to the press. In addition, 10-daily Approximate Returns of Traffic (revenues) have been appearing regularly during the past three or four months.

The returns for the year 1918 are surprisingly good as will be seen from the following statement:

		Compared with 1917	
	1918	Increase	Decrease
Operating revenues	$77,652,153	$13,778,449	.....
Operating expenses	34,322,615	4,282,051	.....
Net operating revenues	$43,324,538	$9,496,399	.....
Income debits	$11,033,562	.....	$2,269,878
Income credits	1,209,144	108,647	.....
Net income debits	$9,824,418	.....	$2,378,525
Surplus for the year	$33,505,120	$11,874,924	.....

Operating expenses contain $1,777,422 for depreciation of rolling stock. The operating ratio was slightly over 44, compared with 47 in 1917 and 52 in 1915. Net operating revenues represent a return of 10.4 upon the cost of road and equipment, and are sufficient to cover net income debits more than four times. The surplus for the year is equivalent to 29 per cent upon the funds which the government has invested in the properties out of its own funds. Out of surplus $3,967,487 was invested in Additions to Property and $1,617,811 was used in retiring funded debt. By these means and the investment of other funds, the government equity in the property was increased during the year by $7,644,488.

The report shows an increase in the length of line by 28 kilometres only. Seven locomotives were purchased and 21 goods wagons were constructed. In addition, 200 wagons were leased upon a more or less permanent basis. The increase in performance per unit of equipment, however, indicates that purchases will have to be made more freely in the near future. Locomotive performance increased from 43,772 kilometres per year to 47,512. Carriage performance increased from 97 passenger kilometres per seat per day to 103, and wagon performance, measured in "Ton kilometres per ton of carrying capacity per running day" increased from 49.1 to 64.5. This measure is more severe than "kilometres per loaded car" in that it penalizes a wagon by the number of days that it was available for loads but was not used. Average train load shows an increase from 244 to 257 "long" tons. Train load has shown a consistent increase since the first statistics were compiled. Also the average haul per ton has been steadily increasing, from 165 kilometres in 1917 to 184 in 1918. In 1915 this figure was 141 kilometres. Passenger traffic exhibits similar tendencies.

It is explained in the preliminary statement that the season of 1918 was remarkably favorable for a good showing and that a similar improvement in 1919 is not to be expected, but the published figures for revenue, including results up to the end of July, indicate that the 1918 figures will be exceeded comfortably in 1919.

* * *

Col. John Stevens, chairman of the Technical Commission of the Trans-Siberian Railway, has returned to Vladivostock after a visit of nearly a week in Peking and Tientsin. No reports have been given out, but it is believed that his visit concerned the attitude to be assumed by China upon the withdrawal of American forces along the Chinese eastern section. This withdrawal has been reported as imminent several times by the press of a certain country.

* * *

The sixth conference of the traffic managers and accountants of the Chinese Government Railways upon the subject of through traffic has taken a temporary adjournment after a session of two weeks. The session just closed made history in that for the first time plans have been agreed upon for a comprehensive interchange of goods wagons. Under the plans now formulated, through shipments may be transferred at the option of the receiving line, but at its own expense. The rate of car hire is 10 cents per ton per day. At the end of 12 days a penalty rate of 40 cents begins to run, as a means of forcing return to home line promptly. (It is anticipated that after locomotive superintendents have brought about uniform standards of repairs, inspection and lubrication, this penalty can be modified or removed.) Settlements are to be made between lines on the basis of daily balances and will be effected through the clearing house, attached to the Ministry of Communications. Wagons unfit for service are to be returned to home line for heavy repairs. So far as consistent with safe operation, light repairs will be left for the home line to make, the line upon which discovered to be responsible for costs. All repairs are to be made at cost, with no percentage for overhead. Junction reports will be made to the clearing house which will keep a car register of movements and be responsible for accuracy of charges. This subject has been under discussion ever since through traffic was attempted first, five years ago.

* * *

The adjourned session of the traffic managers will convene two weeks hence for the purpose of taking under consideration the report of a sub-committee upon uniform classification of goods.

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There is an unconfirmed report here that the Ministry of Communications has engaged the services of four foreign experts to assist in the standardization of rolling stock. France, England, Japan and America are said to be represented upon this group. For two years or more a Railway Technics Commission composed of Chinese has been working upon this subject. It is reported that this commission will submit to a convention of the mechanical officers of the lines, to be called next spring, a set of standards for goods wagons. It is expected naturally that the representatives of the various national types will have criticisms to offer. In order to meet these criticisms and to insure fair treatment to all concerned, the group of technical advisers, referred to above, will be constituted as a quasi board of arbitration, with powers of recommendation only. Such recommendations in the past, however, have carried great weight with the Ministry.

Equipment and Supplies

Locomotives

THE CENTRAL OF NEW JERSEY is inquiring for 11 Mikado locomotives.

BELGIAN GOVERNMENT. Unconfirmed reports are to the effect that the Belgian Government has divided an order for 660 Consolidation locomotives equally between the American Locomotive Company and the Baldwin Locomotive Works.

Freight Cars

THE GULF REFINING COMPANY is reported as having ordered 1,000 tank cars from the Standard Steel Car Company.

THE PRESSED STEEL CAR COMPANY has issued inquiries for the Koppel Industrial Car Company for specialties for 20 to 50 and 300 cane cars.

Trade Publications

BALANCING APPARATUS.—A small pamphlet has been issued by the Vibration Specialty Company, Philadelphia, Pa., describing briefly the service which this company is prepared to render and its balancing apparatus to eliminate vibration in heavy machinery. Several illustrations show rotors and crank shafts which were put in balance on equipment of this company.

AEROIL THAWING OUTFITS AND TORCHES.—Bulletin No. 10 has recently been issued by the Aeroil Burner Company, Inc., 400 Main street, Union Hill, N. J. This illustrates the Aeroil thawing outfit and shows their application in thawing out hoppers of coal cars. The outfits are designed especially for use in the removal of ice and snow from frozen coal, sand and ore cars, hoppers, pockets, tracks and switches, etc.

WELDING AND CUTTING EQUIPMENT.—The Carbo-Hydrogen Company of America, Pittsburgh, Pa., has issued nine bulletins bound in a folder, describing cutting and welding torches and tips, regulators, and a portable cutting outfit mounted on a truck. All of the parts for carbo apparatus are catalogued in one of the bulletins and another contains directions for operating carbo cutting torches, bringing out some points that should be carefully observed when operating any cutting torch.

DROP FORGINGS.—J. H. Williams & Co., Brooklyn, N. Y., manufacturers of Superior drop forgings and drop-forged tools, have issued the seventeenth edition of their catalogue, containing 160 pages, 4 in. by 6 in., fully illustrating and describing their standard stock specialties. These include several new lines, namely, "Agrippa" set screw pattern turning tool holders, "Agrippa" boring tool posts, "Vulcan" forged-cutter tool holders and several new sets of drop-forged wrenches. The book also contains a description of the drop-forging process in simple, non-technical style for the benefit of those not conversant with its details.

FURNACES FOR HEAT TREATING.—Catalogue No. 75, containing 80 pages, 8½ in. by 11 in., has been published by the Chicago Flexible Shaft Company, Chicago, and is devoted to Stewart gas and oil furnaces, which are adapted to a wide range of heat treating operations. These furnaces burn only gas or oil fuel and are built in many designs and sizes to meet a great variety of conditions, the line being divided into oven, crucible and forge types. Several special features of the Stewart furnaces are described, including a U-shaped bottom slab which makes it unnecessary to use muffles and gives to the furnace area the advantage of the transfer of heat through the bottom and sides of the enclosure. The many types of furnaces are separately described and illustrated, specifications and prices being given also, in addition to which the book contains instructions as to the proper methods of hardening steel, carbonizing, cyanide treating, etc.

Railway Officers

Railroad Administration

Regional

Riley Williams has been appointed federal superintendent of operation of the Brooklyn Eastern District Terminal succeeding **E. J. Sullivan,** assigned to other duties.

Operating

T. J. Scott, assistant freight trainmaster of the Pennsylvania, Eastern Lines, at Miffln, Pa., has resigned. Mr. Scott has been succeeded by **W. R. Lockard,** assistant freight trainmaster at Altoona. **E. L. Lowder,** yard master at Altoona, has been promoted to succeed Mr. Lockard.

Corporate

Executive, Financial, Legal and Accounting

Carl R. Gray, president of the Western Maryland, has been elected president of the Union Pacific, with headquarters at Omaha, Neb. (Particulars of the appointment are given elsewhere in this issue.) **E. E. Calvin,** federal manager, has been elected vice-president in charge of operations, effective at the end of federal control.

J. M. Lee, Kansas City, Kan., has been appointed receiver of the Kansas City Northwestern, with office in that city, succeeding **L. S. Cass,** who has resigned. The appointment was made by Judge William C. Hook of the United States District Court, at Leavenworth, Kan., who recently ordered that all operations of the road be stopped.

Obituary

Samuel M. Brown, formerly general freight and passenger agent on the Denver & Rio Grande, at Leadville, Colo., died recently in that city.

Stephen Pearson Brown, vice-president and general manager of the Ford, Bacon & Davis Corporation, managing engineer of Ford, Bacon & Davis, engineers of New York City, and from 1912 to 1917 chief engineer in charge of design and construction of the Mount Royal tunnel and terminal development in Montreal for the Canadian Northern, was drowned December 14 after breaking through the ice at Sebec Lake, Me. Mr. Brown was born in Dover, Me., April 29, 1877. Upon being graduated from the Massachusetts Institute of Technology, he gained shop experience as a blacksmith, machinist and carpenter in the Brown Mills at Dover. His professional career began in 1900 as junior partner in the firm of Collier & Brown, consulting engineers, of Atlanta, Ga., with whom he remained until 1904, when he became inspector of the Bridgeport Station works of the New York, New Haven & Hartford. The following year he was appointed resident engineer on the Port Morris depression of the New York Central. From 1906 until 1908 he was respectively principal assistant engineer in charge of construction and general superintendent of all work west of Fifth avenue on the crosstown section of the Pennsylvania tunnels under New York City. In 1908 he went abroad to investigate European tunnel practise. During 1909 and until 1912, he was chief engineer of the Tidewater Building Company and the T. B. Bryson Company, which built a section of the Fourth Avenue Rapid Transit four-track subway in Brooklyn, N. Y. His chief work until his death has been mentioned above. In addition to his business connections Mr. Brown was a member of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Railway Engineering Association, Engineering Institute of Canada, Institution of Civil Engineers (British) and the Engineers' Club of New York.

EDITORIAL

Railway Age

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The Decline of Railway Bridge Work

It has been so long since the railroads have undertaken certain classes of major improvements that their absence has ceased to be conspicuous. This is most decidedly the case in the field of bridge construction. Many large projects undertaken before the beginning of the European war were continued for some years thereafter, but the feats of engineering brought to mind by the names Quebec, Hell Gate, Memphis, Brunot's Island, Metropolis and Sciotoville have all passed into history, followed more recently by the work at Blacks Run, New London and Louisville. That large bridge construction is not absolutely dead is indicated by the work now in progress on the Baltimore & Ohio bridge at Pittsburgh and by occasional references to proposed projects at Niagara Falls, Castleton, Cincinnati, Detroit and New Orleans, some of these being quite definite while others are decidedly visionary. All of these, however, are in a more or less dormant state at the present time and will continue to be until the ability of the railroads to secure funds for such purposes has been restored to normal.

Senator Cummins' Appeal to Congress

When the history of the relations between the government and the railroads during recent years is written the two facts which probably will stand out in that history as the most extraordinary will be the defeat of the railroad appropriation bill in March, 1919, and the attitude toward the return of the railways to private management which was assumed by Congress almost, if not quite, to the end of the year 1919. The railroad appropriation bill was defeated by a filibuster last spring, although everybody recognized the fact that the appropriation was actually needed and that the defeat of the bill might prevent the Railroad Administration from functioning at all and would certainly prevent it from carrying out any substantial program of railroad improvements—the latter being the effect which it actually has had. But extraordinary and astonishing as was the defeat of the railroad appropriation bill, it was not so extraordinary and astonishing as the fact that when, according to President Wilson's announcement, the date on which the railways would be returned to private management was less than two weeks away, Congress complacently prepared to take a recess without having passed any railroad legislation. Every intelligent man in America knows that the return of the railways to private operation without some kind of legislation having been passed would result in financial disaster not only to them but to the nation; yet Senator Cummins considered it necessary this week to appeal to Congress to do something about this before taking its ease before the holidays. The effects of failure to pass any legislation, or the passage of bad legislation, would be felt throughout the country both immediately and for years to come. The facts about the railroad situation have been dinned into the ears of Congress for months. And yet Congress continues to do nothing. Under government ownership and management Congressional action upon railroad questions of the greatest importance would be necessary at every session. If, under present conditions, Congress cannot be made to appreciate the railroad situation and influenced to do something, how can any person who is not a downright lunatic believe it could be influenced to act with the intelligence and promptness that it would be necessary for it to act under government ownership if the railways were to be adequately developed and efficiently managed?

Emergency Train Protection

The need for emergency protection arises at times on all railroads. In meeting such demands it is evident that some lines equipped with automatic block signals are not getting the maximum possible protection from these installations. Many lines traverse rough country, with deep cuts and numerous tunnels; run along the banks of streams that are liable to overflow or are subject to other dangerous conditions. As a protection watchmen or track walkers are employed to inspect constantly the conditions existing at such locations, and provision is made for quick communication with headquarters in cases of emergency. At those locations where automatic signals are in service it would be to the advantage of the roads if more general use were made of them by providing means whereby the watchman or track walker might be able to place the signals in the "stop" position on each side of the danger point as an emergency protection until he is enabled to notify the proper officers. Objections might be raised that these men should not be allowed to manipulate the signals, but certainly if they are capable of being intrusted with the responsibility of protecting trains otherwise in emergencies there should be no objection to their opening a track relay by means of a knife switch conveniently located or by cutting a circuit wire which might be made readily accessible. This is not an untried idea, as is evidenced by its application to some roads which now provide permanent emergency signal protection for trains at dangerous locations. It is a practice which should be more generally followed in the future in order to more nearly obtain the maximum benefits which can be derived from an installation of signals. The application of such protection to a particular road is a matter of detail which may be worked out by the signal department on that road.

The Railroads' Advertising Campaign

It is no reflection on advertising that the great American circus was one of the first large national institutions to test out its possibilities on a scale commensurate with the scope of the business. But one of the easiest ways to advertise is to pile adjective on adjective in an appeal to imagination rather than reason. As a matter of fact, this kind of advertising has been so widespread as to be synonymous with advertising in the minds of, probably, the majority of people. Very recently, however, advertising of an entirely different kind has been tried out fairly extensively. Those most conservative of institutions, the national banks, have tried it with success. Men and institutions that have been played upon by demagogues and yellow newspapers, have found it possible